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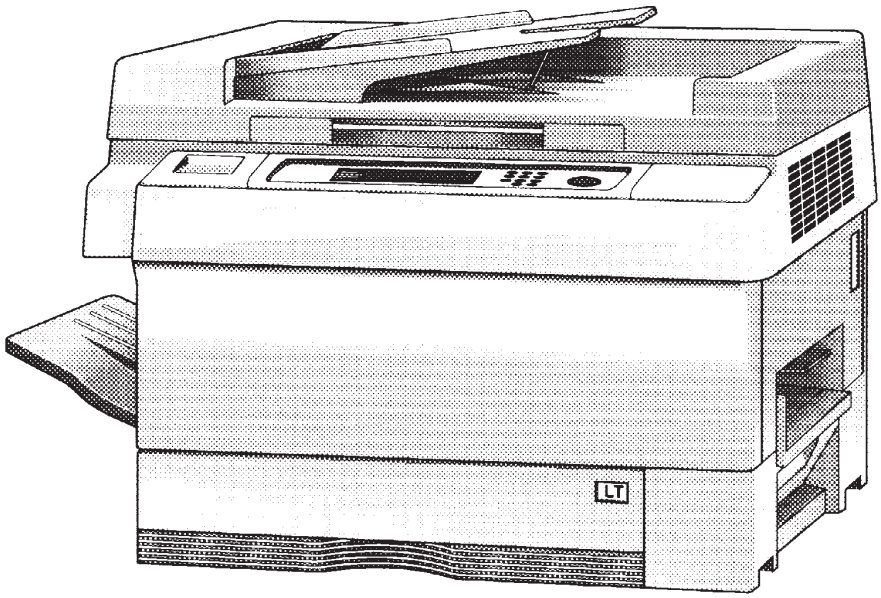

A151/A152/A202/A203

SERVICE MANUAL

RICOH GROUP COMPANIES

PN: RCFM3213

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A151/A152/A202/A203

SERVICE MANUAL

RICOH GROUP COMPANIES

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A151/A152/A202/A203

FIELD SERVICE MANUAL

PN: RCFM3213

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Ricoh Corporation

LEGEND

PRODUCT CODE	COMPANY		
	GESTETNER	RICOH	SAVIN
A151	2613	FT3013	9013
A152	2613Z	FT3213	9013Z
A202	2713	FT3513	9113
A203	2613	FT3713	9013Z

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IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. If the hot roller temperature is low when the main switch is turned on, the copier starts idling automatically when the warm-up period is completed. Keep hands away from the mechanical and the electrical components to avoid any injury.
6. If the start key is pressed before the copier completes the warm-up period (Ready indicator starts blinking), keep hands away from the mechanical and the electrical components as the copier starts making copies as soon as the warm-up period is completed.
7. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.

- **CAUTION** -

> The RAM board on the main control board has a lithium battery which can explode if replaced incorrectly. Replace the battery only with an identical one. The manufacturer recommends replacing the entire RAM board. Do not recharge or burn this battery. Used batteries must be handled in accordance with local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate the toner cartridge or the used toner. Toner dust may ignite suddenly when exposed to open flame.
2. Dispose of used toner, developer, and organic photoconductor according to local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

Rev. 4/97

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OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration: Desk top

Copy Process: Dry electrostatic transfer system

Original Type: Sheet/Book

Original Alignment: Left center

Original Size: Maximum: A3/11" x 17" (lengthwise) – FT3213 copier
B4/10" x 14" (lengthwise) – FT3013 copier

Copy Paper Size: Maximum: B4/10" x 14" (lengthwise)
Minimum:
Paper Tray: A5/5 1/2" x 8 1/2" (lengthwise)
Bypass Feed: A6/5 1/2" x 8 1/2" (lengthwise)

Copy Paper Weight: Paper tray feed – 64 to 90 g/m^2 (17 to 24 lb)
Bypass feed – 52 to 105 g/m^2 (14 to 28 lb)

Reproduction Ratios: 2 Enlargement and 3 Reduction (FT3213 copier only)

	A4 Version	Letter Version
Enlargement	141% 122%	129% 121%
Full size	100%	100%
Reduction	93% 82% 71%	93% 74% 65%

Zoom: From 61% to 141% in 1% steps
(FT3213 copier only)

Copying Speed: 13 copies/minute (A4/8 1/2" x 11" lengthwise)
10 copies/minute (B4/8 1/2" x 14")

Warm-Up Time: 30 seconds (at 20°C/68°F)

First Copy Time: 9 seconds (A4/8 1/2" x 11" lengthwise)

Copy Number Input: Number keys, 1 to 99

Manual Image Density: 7 steps

Toner Type: Type 320

Developer Type: Type 310

Automatic Reset: 1 minute standard setting; can also be set to 3 minutes or no automatic reset.

Energy Saver Function: Automatic

Paper Capacity: Paper tray – 250 sheets
Bypass feed table – 1 sheet

Toner Replenishment: Cartridge exchange (320 g/cartridge)

Copy Tray Capacity: 100 sheets (B4/10" x 14" or smaller)

Power Source: 110V/ 60Hz/ 15A (for Taiwan)
115V/ 60Hz/ 15A (for North America)
220V – 240V/ 50Hz/ 8A (for Europe)
220V/ 60Hz/ 8A (for Middle East)
220V/ 50Hz/ 8A (for Asia)
(Refer to the serial number plate (rating plate) to determine the power source required by the machine.)

Power Consumption:

	Copier Only	With DF*
Maximum	1.4 kVA	1.5 kVA
Warm-up	620 VA (average)	640 VA (average)
Copy cycle	810 VA (average)	860 VA (average)
Ready	160 VA (average)	180 VA (average)

Noise Emission:

	Copier Only	With DF*
Maximum	58 db	60 db
Copy cycle	Less than 55 db	Less than 55 db
Ready	Less than 39 db	Less than 39 db

Dimensions:

	Width	Depth	Height
Copier with platen cover and copy tray	713 mm (28.1")	592 mm (23.3")	400 mm (15.7")
Copier with document feeder and copy tray*	713 mm (28.1")	592 mm (23.3")	463 mm (18.2")

***NOTE:** The document feeder can be installed only on the FT3213 copier.

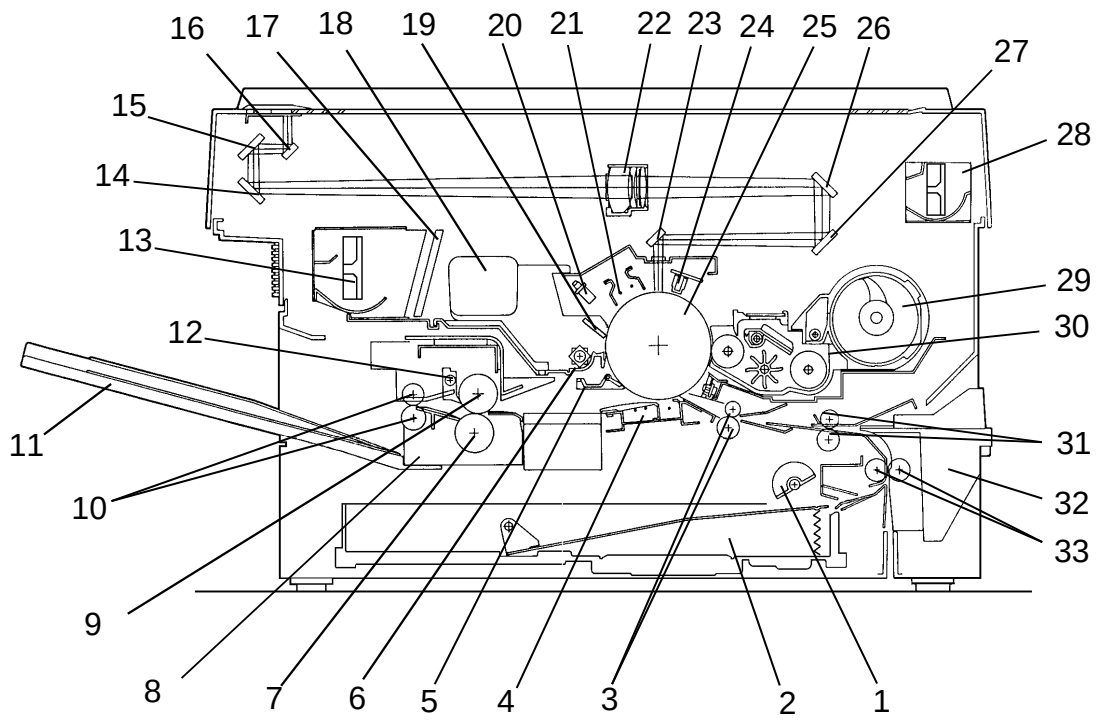
Weight:	Copier only:	43 kg (94.8 lb)
	With DF:	50 kg (110.2 lb)
Optional Equipment: (Sales items)	Document feeder (FT3213 copier only) Key counter	
Optional Equipment: (Service items)	Drum anti-condensation heater Optics anti-condensation heater Pre-transfer lamp Optics cooling fan (for FT3013 copier only)	

- Specifications are subject to change without notice.

Model Designation:	A151 = FT3013 A152 = FT3213

GUIDE TO COMPONENTS

1. MECHANICAL COMPONENT LAYOUT



1. Semicircular Feed Rollers
2. Paper Tray
3. Registration Rollers
4. Transfer and Separation Corona Unit
5. Pick-off Pawl
6. Cleaning Unit
7. Pressure Roller
8. Fusing Unit
9. Hot Roller
10. Exit Rollers
11. Copy Tray
12. Hot Roller Strippers
13. Exhaust Blower Motor
14. 3rd Mirror
15. 2nd Mirror
16. 1st Mirror
17. Ozone Filter
18. Used Toner Tank
19. Cleaning Blade
20. Quenching Lamp
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23. 6th Mirror
24. Erase Lamp
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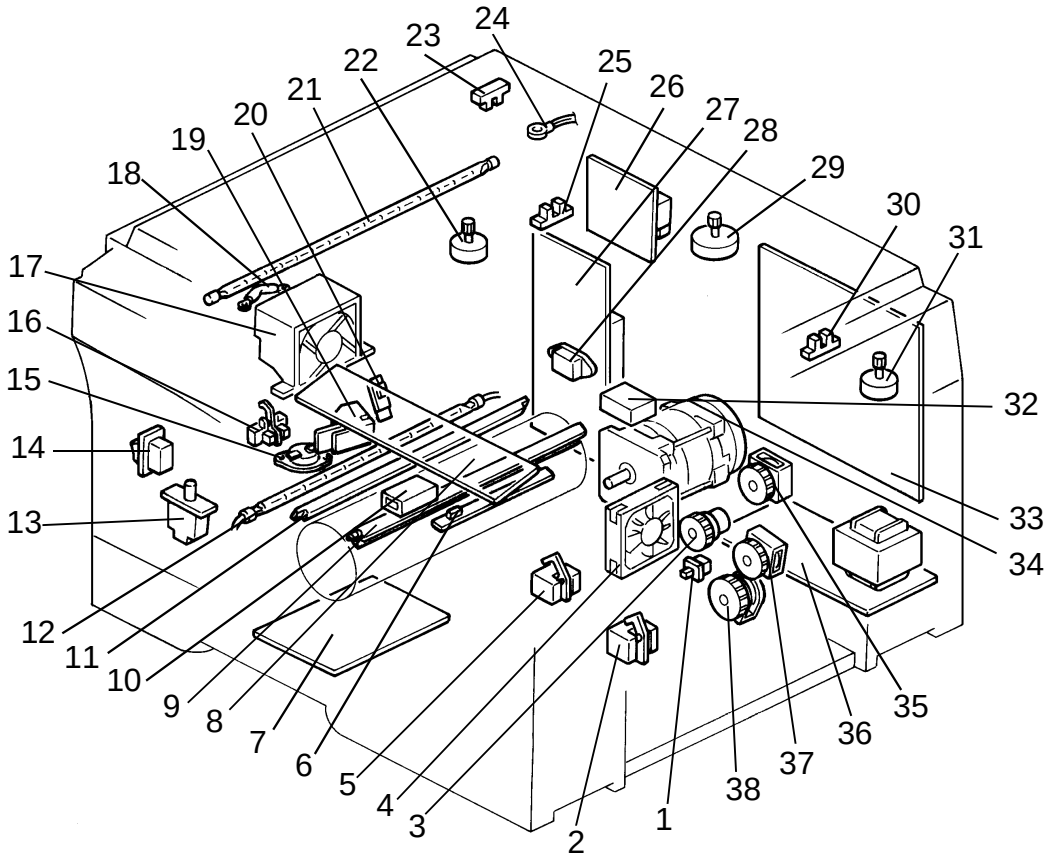
29. Toner Supply Unit
30. Development Unit
31. 2nd Relay Rollers
32. By-pass Feed Table
33. 1st Relay Rollers

2. ELECTRICAL COMPONENT LAYOUT



1. Paper Tray Switch
2. Relay Sensor
3. Registration Clutch
4. Optics Cooling Fan Motor (FT3213 only)
5. Registration Sensor
6. Image Density Sensor
7. Power Pack-TC/SC
8. Operation Panel Board
9. Erase Lamp
10. Total Counter
11. Quenching Lamp
12. Fusing Lamp
13. Front Cover Safety Switch
14. Main Switch
15. Fusing Thermoswitch
16. Exit Sensor
17. Exhaust Blower Motor
18. Optics Thermofuse
19. Auto Image Density Sensor
20. Fusing Thermistor
21. Exposure Lamp
22. Lens Motor (FT3213 copier only)
23. Scanner Home Position Sensor
24. Optics Thermistor
25. Lens Home Position Sensor (FT3213 copier only)
26. Power Pack-CC/Grid/Bias
27. AC Drive Board
28. Fusing Triac (115 V only)
29. Scanner Motor
30. 4th/5th Mirror Home Position Sensor (FT3213 copier only)
31. 4th/5th Mirror Motor (FT3213 copier only)
32. Main Motor Capacitor
33. Main Board
34. Main Motor
35. Toner Supply Clutch
36. DC Power Supply Board
37. Relay Roller Clutch
38. Paper Feed Clutch

3. ELECTRICAL COMPONENT DESCRIPTIONS

Motors

SYMBOL	NAME	FUNCTION	INDEX NO.
M1	Main Motor	Drives all the main unit components except for the optics unit and fans. (115/220–240 Vac [ac synchronous])	34
M2	Scanner Motor	Drives the scanners (1st and 2nd). (dc stepper)	29
M3	Lens Motor	Positions the lens according to the selected magnification. (dc stepper) … FT3213 copier only	22
M4	4th/5th Mirror Motor	Positions the 4th/5th mirrors according to the selected magnification. (dc stepper) … FT3213 copier only	31
M5	Optics Cooling Fan Motor	Prevents built up of hot air in the optics cavity. (24 Vdc) … FT3213 copier only	4
M6	Exhaust Blower Motor	Removes heat from around the fusing unit and moves the ozone built up around the charge section to the ozone filter. (24 Vdc)	17

Magnetic Clutch

SYMBOL	NAME	FUNCTION	INDEX NO.
MC1	Registration Clutch	Drives the registration rollers.	3

Magnetic Spring Clutches

SYMBOL	NAME	FUNCTION	INDEX NO.
MSC1	Toner Supply Clutch	Drives the toner supply roller.	35
MSC2	Relay Roller Clutch	Drives the 1st and 2nd relay rollers.	37
MSC3	Paper Feed Clutch	Starts paper feed.	38

Switches

SYMBOL	NAME	FUNCTION	INDEX NO.
SW1	Main Switch	Supplies power to the copier.	14
SW2	Front Cover Safety Switch	Cuts the ac power line, when the front cover is open.	13
SW3	Paper Tray Switch	Detects when the paper tray is set.	1

Sensors

SYMBOL	NAME	FUNCTION	INDEX NO.
S1	Scanner Home Position Sensor	Informs the CPU when the 1st scanner is at the home position.	23
S2	Lens Home Position Sensor	Informs the CPU when the lens is at the home position (full size position). … FT3213 copier only	25
S3	4th/5th Mirror Home Position Sensor	Informs the CPU when 4th/5th mirrors assembly is at the home position (full size position). … FT3213 copier only	30
S4	Registration Sensor	1) Detects misfeeds. 2) Controls the relay roller clutch stop timing.	5
S5	Exit Sensor	Detects misfeeds.	16
S6	Relay Sensor	1) Detects when copy paper is set on the by-pass feed table. 2) Detects misfeeds.	2
S7	Image Density (ID) Sensor	Detects the density of the image on the drum to control the toner density.	6
S8	Auto Image Density Sensor (ADS)	Senses the background density of the original.	19

Printed Circuit Boards

SYMBOL	NAME	FUNCTION	INDEX NO.
PCB1	Main Board	Controls all copier functions both directly and through the other PCBs.	33
PCB2	AC Drive Board	Drives the main motor, exposure lamp, fusing lamp, and quenching lamp.	27
PCB3	DC Power Supply Board	Converts the wall outlet ac power input to +5 volts, +24 volts, and a zero cross signal.	36
PCB4	Operation Panel Board	Informs the CPU of the selected modes and displays the copier status and condition on the panel.	8

Lamps

SYMBOL	NAME	FUNCTION	INDEX NO.
L1	Exposure Lamp	Applies high intensity light to the original for exposure.	21
L2	Fusing Lamp	Provides heat to the hot roller.	12
L3	Quenching Lamp	Neutralizes any charge remaining on the drum surface after cleaning.	11
L4	Erase Lamp	Discharge the drum outside of the image area. Provides leading/trailing edge erase and side erase.	9

Power Packs

SYMBOL	NAME	FUNCTION	INDEX NO.
P1	Power Pack –CC/Grid/Bias	Provides high voltage for the charge corona, grid, and development roller.	26
P2	Power Pack –TC/SC	Provides high voltage for the transfer and separation corona.	7

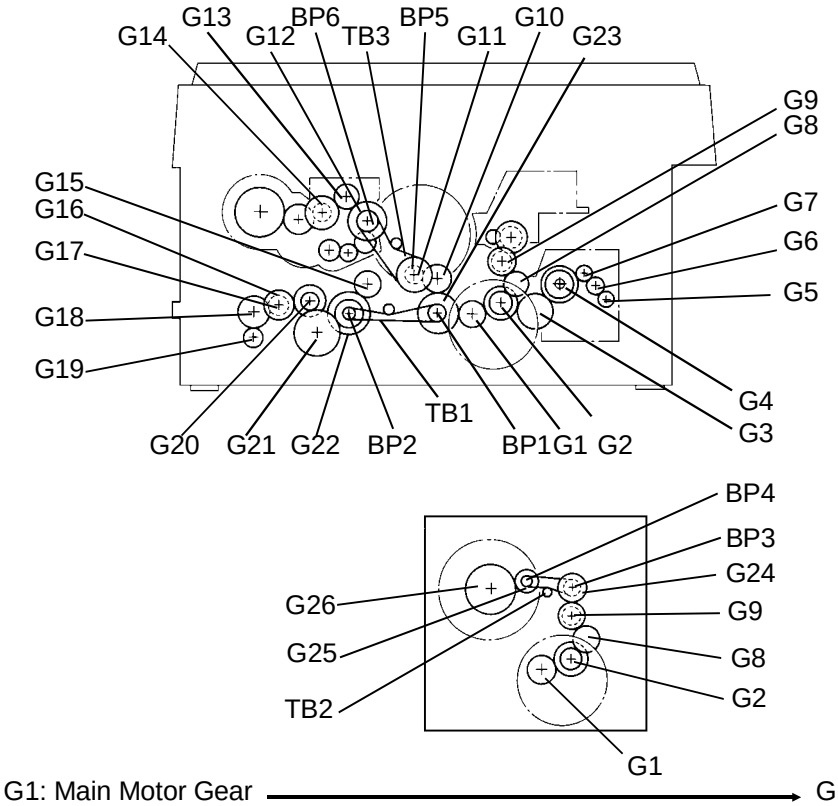
Counter

SYMBOL	NAME	FUNCTION	INDEX NO.
CO1	Total Counter	Keeps track of the total number of copies made.	10

Others

SYMBOL	NAME	FUNCTION	INDEX NO.
TH1	Fusing Thermistor	Monitors the fusing temperature.	20
TH2	Optics Thermistor	Monitors the optics temperature.	24
TS	Fusing Thermoswitch	Provides back-up overheat protection in the fusing unit.	15
TF	Optics Thermofuse	Provides back-up overheat protection around the exposure lamp.	18
C	Main Motor Capacitor	Start capacitor.	32
TR	Fusing Triac	Switches the fusing lamp on and off. (115 V only) Note: In the 220V-230V/240V version, the triac is built-in the ac drive board	28

4. DRIVE LAYOUT



G1: Main Motor Gear → G2: Relay Gear

G23: Timing Belt Drive Gear → G10 Relay gear

BP1: Timing Belt Pulley

TB1: Timing Belt

A

G11: Timing Belt Drive Gear

BP5: Timing Belt Pulley

TB3: Timing Belt

Development Section

BP6: Timing Belt Pulley

G12: Development Gear

Development Unit

G13: Relay Gear

G14: Toner Supply CL Gear

Toner Supply CL → Toner Supply Unit

G8: Relay Gear

G9: Relay Gear

B

Cleaning Unit

G3: Fusing Drive Gear

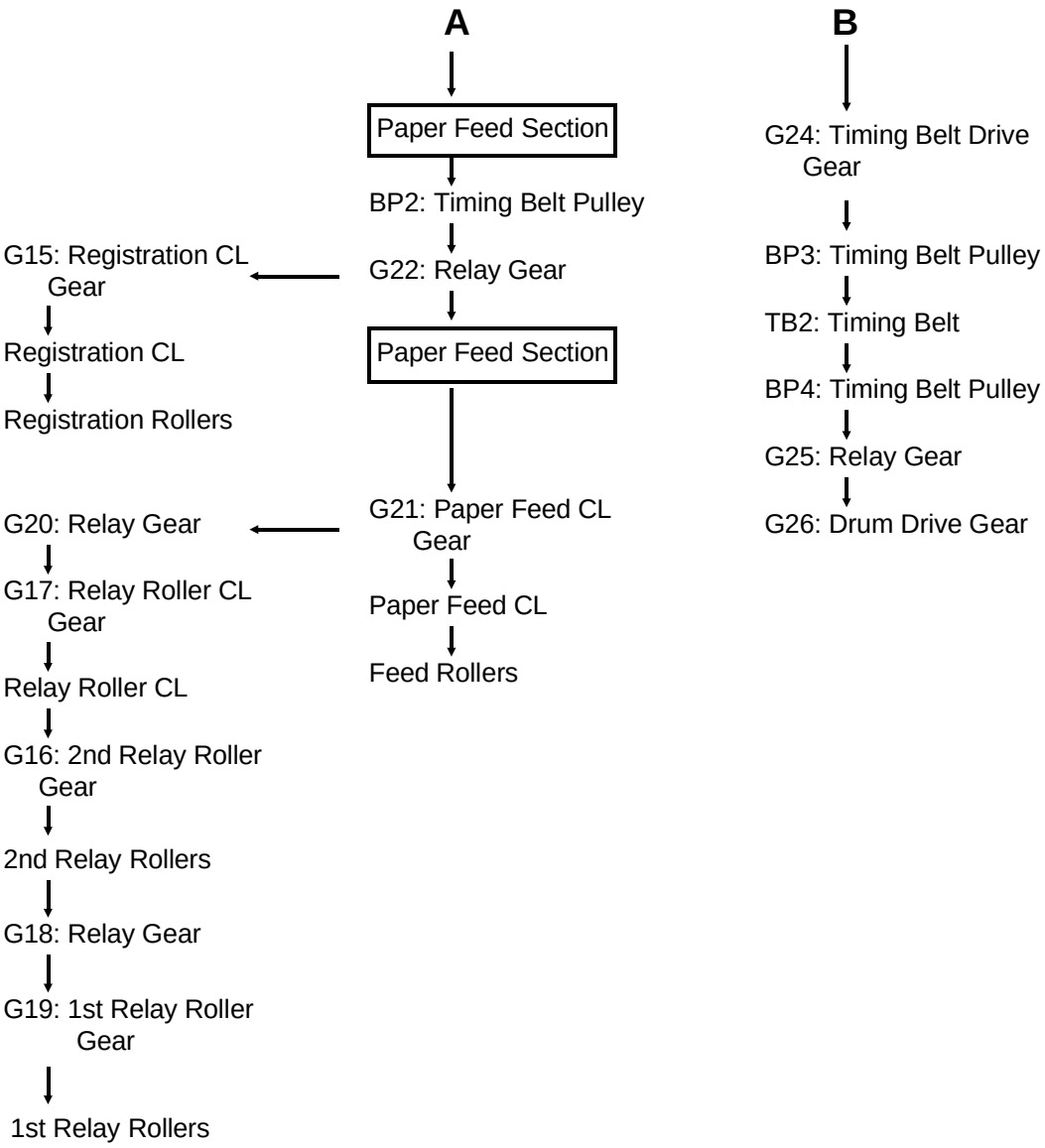
Fusing and Exit Unit

G4: Hot Roller Gear

G7: Relay Gear

G6: Relay Gear

G5: Exit Roller Gear


A
Paper Feed Section
BP2: Timing Belt Pulley
G22: Relay Gear
Paper Feed Section
G21: Paper Feed CL Gear
Paper Feed CL
Feed Rollers
G15: Registration CL Gear
Registration CL
Registration Rollers
G20: Relay Gear
G17: Relay Roller CL Gear
Relay Roller CL
G16: 2nd Relay Roller Gear
2nd Relay Rollers
G18: Relay Gear
G19: 1st Relay Roller Gear
1st Relay Rollers
B
G24: Timing Belt Drive Gear
BP3: Timing Belt Pulley
TB2: Timing Belt
BP4: Timing Belt Pulley
G25: Relay Gear
G26: Drum Drive Gear

INSTALLATION

1. INSTALLATION REQUIREMENTS

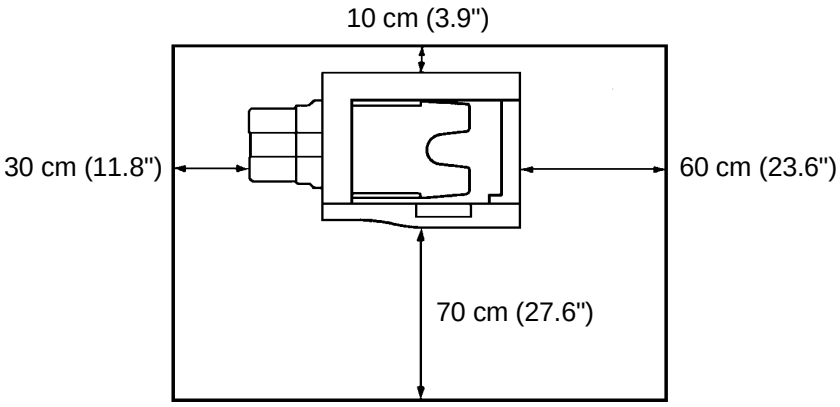
1.1 ENVIRONMENT

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 90% RH
3. Ambient Illumination: Less than 1500 lux (do not exposure to direct sunlight)
4. Ventilation: Room of more than 20 m^3. Room air should turn over at least 30 m^3/hour/person.
5. Ambient Dust: Less than 0.15 mg/m^3 (4 x 10^{-3} oz/yd^3)
6. If the installation place is air-conditioned or heated, place the machine as follows:
   a) Where it will not be subjected to sudden temperature changes.
   b) Where it will not be directly exposed to cool air from an air-conditioner in the summer.
   c) Where it will not be directly exposed to reflected heat from a space heater in winter.
7. Avoid placing the machine in an area filled with corrosive gas.
8. Avoid any places higher than 2000 meters (6500 feet) above sea level.
9. Place the machine on a strong and level base.
10. Avoid any area where the machine may be subjected to frequent strong vibration.

1.2 MACHINE LEVEL

1. Front to back: Within 5 mm (0.2") of level
2. Right to left: Within 5 mm (0.2") of level

1.3 MINIMUM SPACE REQUIREMENTS



1. Front: 70 cm (27.6")
2. Back: 10 cm (3.9")
3. Right: 60 cm (23.6")
4. Left: 30 cm (11.8")

NOTE: A space of at least 10cm (3.9") at the rear of the machine is necessary for smooth air inlet into the machine.

1.4 POWER REQUIREMENTS

1. Input voltage level:

110 V/60 Hz : More than 15 A
115 V/60 Hz : More than 15 A (U.S. Version)
220–240 V/50 Hz : More than 8 A
220 V/60 Hz : More than 8 A
220 V/50 Hz : More than 8 A

2. Permissible voltage fluctuation: ±10%
3. Do not set anything on the power cord.

NOTE: a) Be sure to ground the machine. (Do not connect the grounding wire to a gas pipe.)
b) Make sure the plug is firmly inserted in the outlet.
c) Avoid multi-wiring.

2. INSTALLATION PROCEDURE

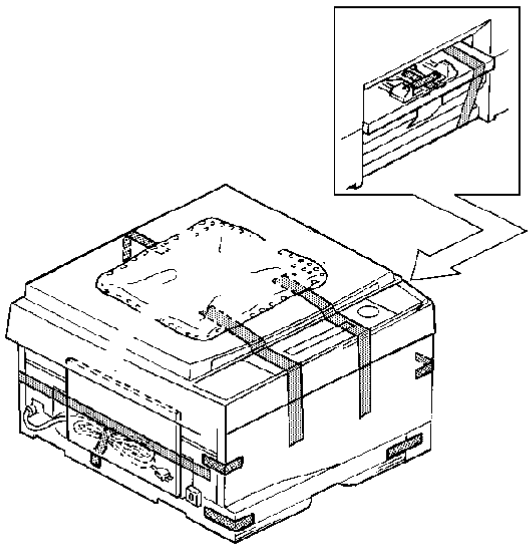
2.1 ACCESSORY CHECK

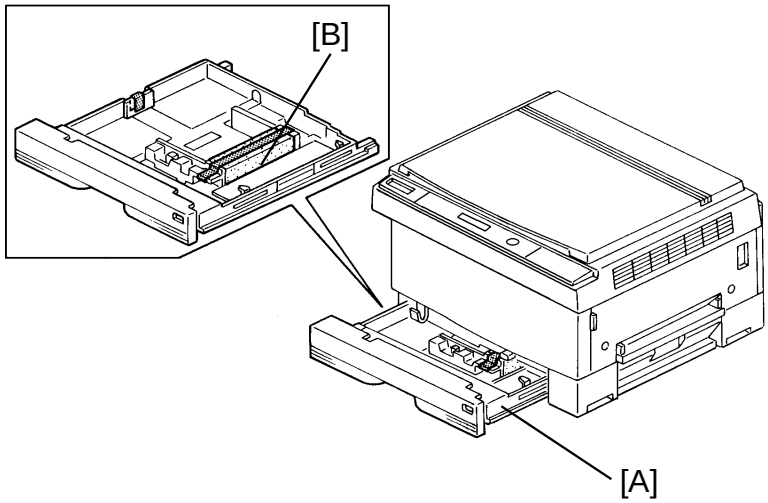
Check the quantity and condition of the accessories in the box according to the following list:

1. Copy Tray.....1
2. Envelope for NECR (–17 Only).....1
3. NECR.....1
4. Operating Instructions (Except –27).....1
5. Decal–Symbol Explanation.....1
6. User Survey Card (–17 Only).....1

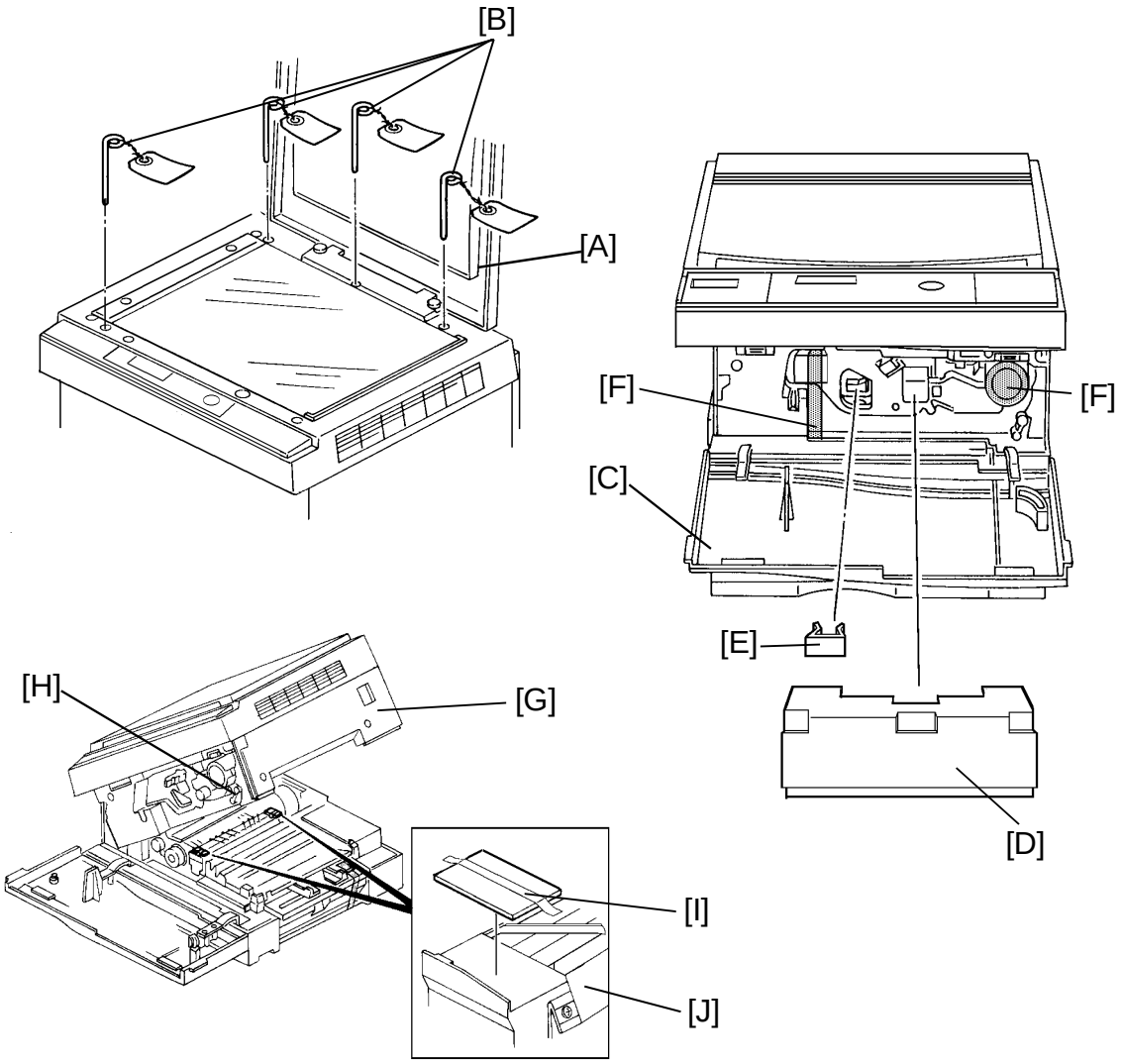
NOTE: (-17 = U.S. Version)

2.2 COPIER INSTALLATION PROCEDURE





1. Remove the strips of tape from the copier as shown.
2. Pull out the paper tray [A], then remove the foam block [B] and tapes. Close the paper tray.



3. Open the platen cover [A] and remove the pieces of tape & the lock pins [B]. (FT3013 copier: 2 pins, FT3213 copier: 4 pins)

   NOTE: Save the lock pins for future shipping use.

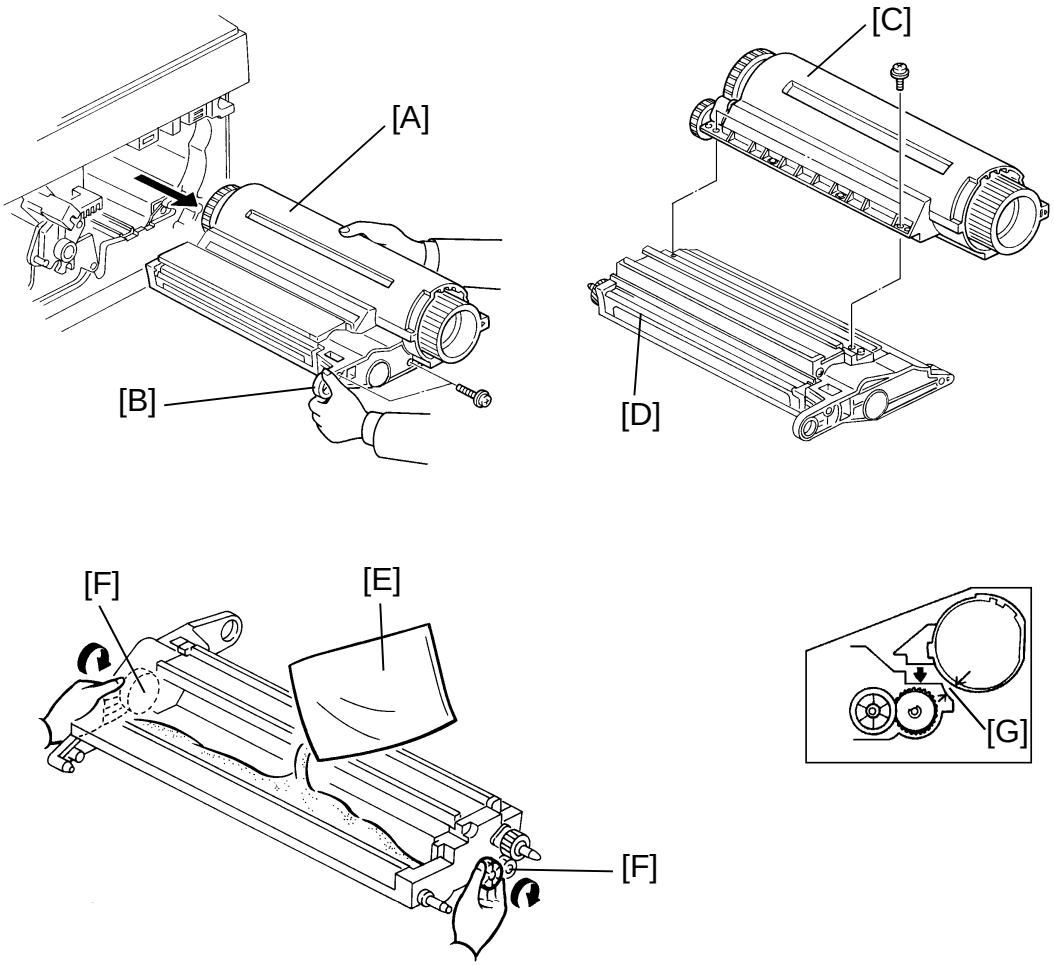
4. Open the front cover [C], and remove the foam block [D].

5. Remove the shipping retainer [E] and tape & seal [F].

   NOTE: Save the shipping retainer for future shipping use.

6. Open the upper unit [G] by pressing the release lever [H] (See "Caution:" below). Gently remove the shipping spacers [I] from both ends of the transfer/separation corona unit [J]. Remove the strip of tape [K] and close the upper unit.

CAUTION: Be sure to place and hold your left hand on top of the upper unit while pushing the release lever to the right with your right hand. The upper unit will raise with force, and holding the upper unit will prevent it from lifting too rapidly.

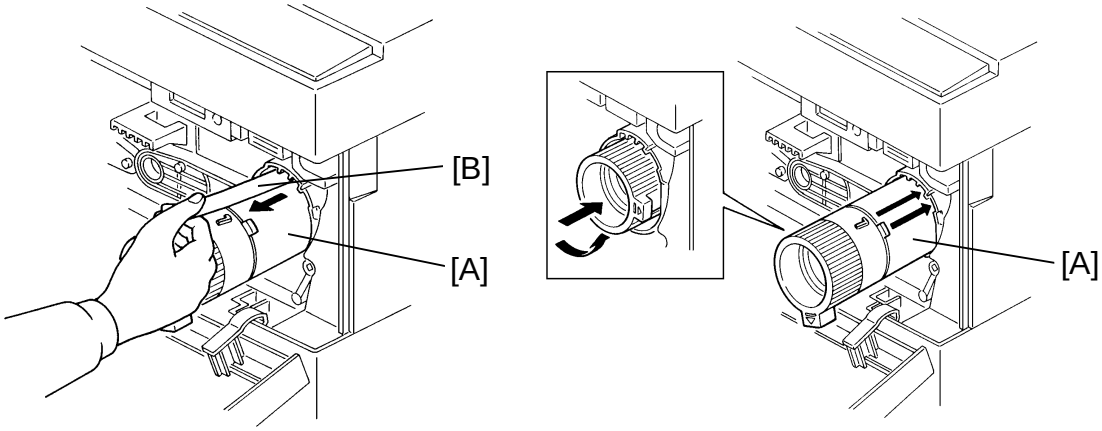


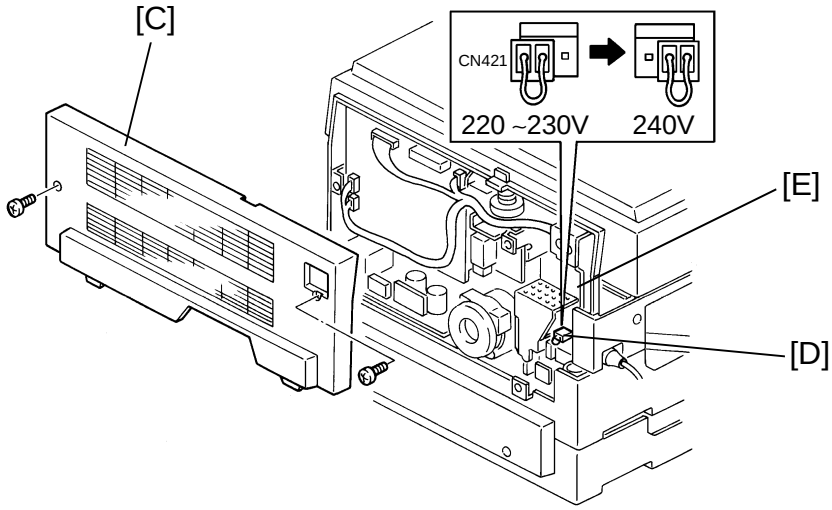
7. Remove the two screws as illustrated above and pull out the development unit [A] by pulling the left side of the development cover [B] and place it on a clean sheet of paper.
8. Remove the toner supply unit [C] from the development unit [D] (2 gold colored screws).

   NOTE: Make sure to remove only the indicated screws.
9. Shake the developer package [E] well, and pour one pack of developer into the development unit while rotating the gears [F] on both sides to distribute the developer evenly as shown in the illustration.

   NOTE: This copier is not equipped with a knob on the paddle roller shaft like other machines. When installing new developer or manually rotating the development roller, always make sure to turn the gears in the direction shown in the illustration above. The copier might be damaged if they are turned in the opposite direction.
10. Reinstall the toner supply unit on the development unit.

    NOTE: Make sure that there is no gap [G] between the toner supply unit and the development unit. (See illustration.)





11. Reinstall the development unit.
12. Shake the toner cartridge [A] well and insert the cartridge while pulling off the seal [B].

    NOTE: Position the cartridge as shown in the above illustration when inserting into copier.
13. Close the front cover.

CAUTION: This procedure (step 14) must be done only in 240 volt areas.

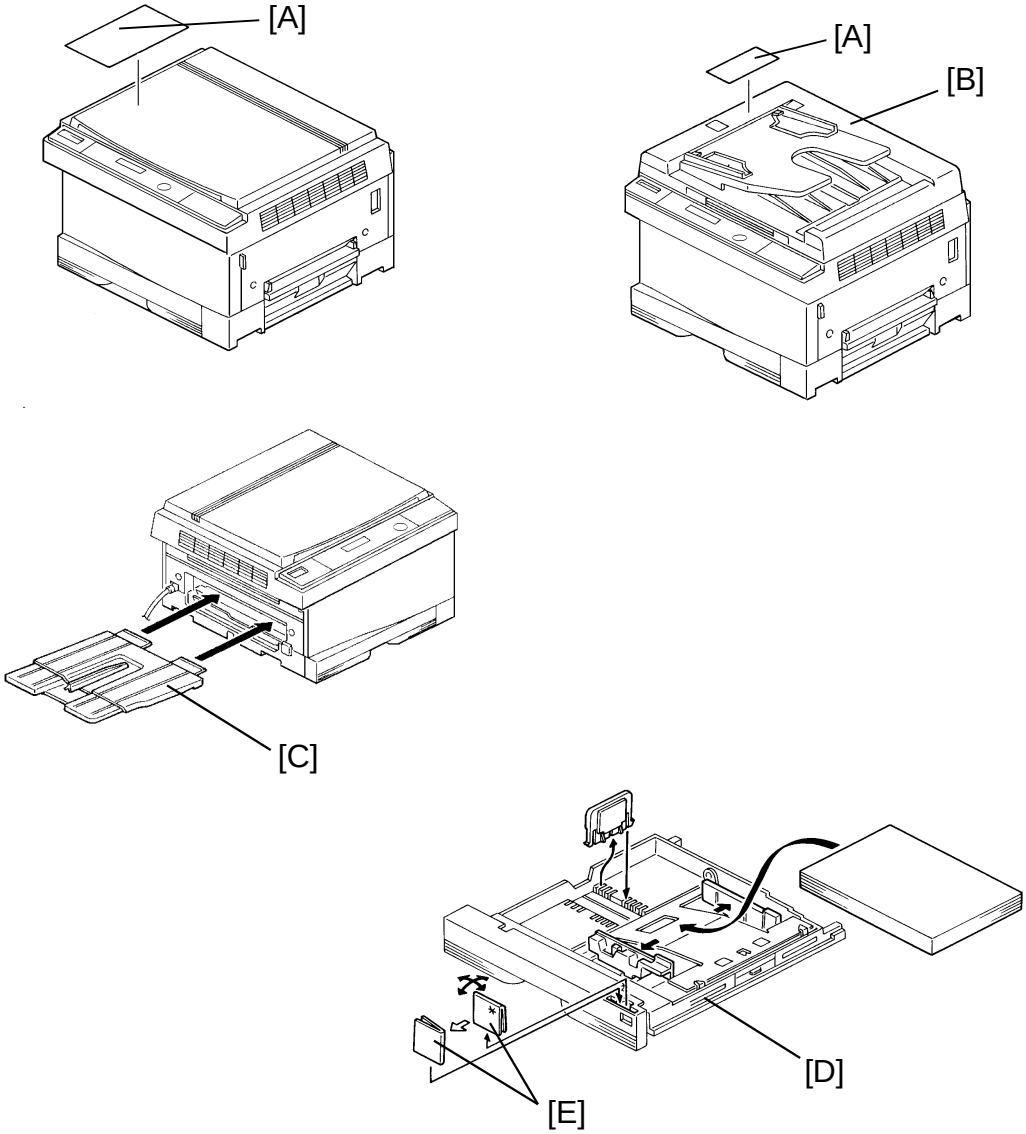
14. Perform the conversion from 220 ~ 230 V to 240 V as follows:
    1) Remove the upper rear cover [C] (2 screws).
    2) Disconnect the short connector [D] (2P/White) on the ac drive board [E] from CN421 and reconnect it to CN421 as shown in the illustration.
    3) Reinstall the upper rear cover.

4) Plug in the machine and turn on the main switch, then lower the platen cover.
5) Enter the SP mode as follows:
   a) Enter "71" using the numeral keys.
   b) Press and hold the Clear/Stop key until a dot (•) appears in the top left corner of the copy counter.
   c) Release the Clear/Stop key and again press the Clear/Stop key.
   d) Press the Lighter key.
6) Perform SP 12 as follows:

SP Mode Number		Procedure
12	Conversion from 220 ~ 230V to 240V.	Enter "12" using the numeral keys. Then, press the Auto Image Density key. Change the data from "0" to "1" using numeral key. Then, press the Auto Image Density key. "12" will start blinking. Go to the step 15. 3).

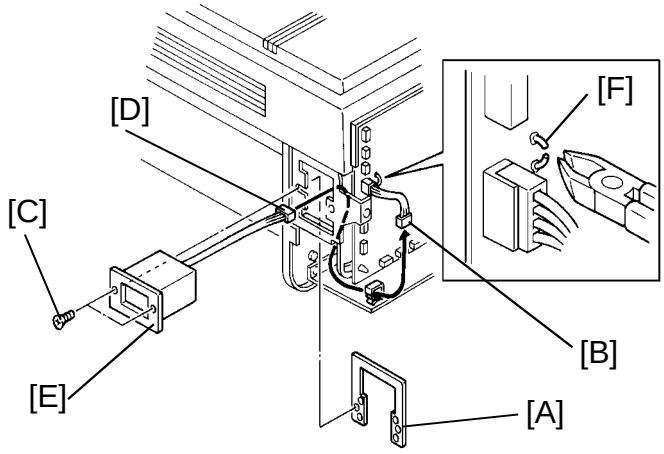
15. Perform the developer initial setting.
1) Plug in the machine and turn on the main switch, then lower the platen cover.
2) Enter the SP mode as follows:
   a) Enter "71" using the numeral keys.
   b) Press and hold the Clear/Stop key until a dot (•) appears in the top left corner of the copy counter.
   c) Release the Clear/Stop key and again press the Clear/Stop key.
   d) Press the Lighter key.
3) Perform SP 65 as follows:

SP Mode Number		Procedure
65	Developer Initial Setting	Enter "65" using the numeral keys and press the Auto Image Density key. "50" will be displayed in the copy counter. Press the Start key for initial setting.



16. Place the symbol explanation decal [A] on the platen cover as shown, or when the DF [B] is installed on the machine, place the decal on the DF as shown.
17. Install the copy tray [C].
18. Load paper into the paper tray [D] according to the instructions on the paper tray.
19. Change the paper size plate [E] to display the correct paper size.
20. Check the machine operation and copy quality.

2.3 KEY COUNTER HOLDER INSTALLATION (OPTION)



NOTE: To install the key counter holder, the following parts are required.
- Key counter bracket [A]
- Key counter harness [B]
- Two M3X6 sunken head screws [C]

1. Turn off the main switch.
2. Open the front cover.
3. Open the upper cover by pressing the release lever.

   NOTE: Be certain to hold the upper unit while releasing.
4. Remove the right cover (2 screws).
5. Cut off the key counter cover on the right cover with a pair of pliers.
6. Remove the upper rear cover (2 screws).
7. Install the key counter harness [B] to CN121 on the main board.
8. Connect the 4P connector [D] of the key counter holder [E] to the key counter harness [B] through the key counter access hole.
9. Position the key counter bracket [A] as shown in the illustration and insert the key counter holder.
10. Align the holes in the key counter bracket with the mounting holes of the key counter holder and secure the key counter holder (2 screws).

    NOTE: The fixing plate has three different hole sizes. Use the holes that match those on the counter that you are installing.
11. Cut the jumper wire (JP101) [F] with a pair of diagonal cutters or other suitable tool.
12. Reinstall all covers.

SERVICE TABLES

1. SERVICE REMARKS

1.1 GENERAL CAUTION

1. To prevent physical injury, keep hands away from the mechanical drive components when the main switch is on (especially during the warm-up cycle). If the Start key is pressed before the copier finishes the warm-up cycle, (Start indicator starts blinking) the copier starts making copies as soon as the warm-up cycle is completed.
2. When the development unit, cleaning unit, drum unit or the DF is removed from the machine, the upper unit becomes lighter. If the upper unit is released under this condition, it tends to open very abruptly. The service engineer might be injured if he is leaning over the machine at this time. Also, the machine might move due to the shock of the upper unit opening abruptly. To avoid possible injury or machine damage, hold the upper unit firmly when opening the unloaded upper unit.
3. Even with the above mentioned components installed the upper unit can open rather rapidly. Due to this possibility it is important to always hold the upper unit with one hand when releasing it from the lower unit. It is also important that the operator also be familiar with the proper method of releasing the upper unit. This condition is not a concern if the DF is installed to the FT3213.
4. Due to variation in the tolerance of the torsion springs, the upper unit cannot hold at an angle of 16 degrees by itself when the DF is installed. To avoid possible injury, always use the upper unit stand to keep the upper unit open.

1.2 DRUM

The organic photoconductor drum is comparatively more sensitive to light and ammonia gas than a selenium drum.

1. Never expose the drum to direct sunlight.
2. Never expose the drum to direct light of more than 1,000 Lux for more than a minute.
3. Never touch the drum surface with bare hands. When the drum surface is touched with a finger or becomes dirty, wipe with a dry cloth or clean with wet cotton. Wipe with a dry cloth after cleaning with wet cotton.
4. Never use alcohol to clean the drum. Alcohol dissolves the drum surface.
5. Store the drum in a cool, dry place away from heat.
6. Take care not to scratch the drum as the drum layer is thin and can be damaged.
7. Never expose the drum to corrosive gases such as ammonia gas.

8. Always keep the drum in the protective sheet when inserting or pulling the drum unit out of the copier to avoid exposing it to bright light or direct sunlight. This will protect the drum from light fatigue.
9. Before pulling out the drum unit, place a sheet of paper under the unit to catch any spilled toner.
10. When installing a **new** drum, do the following:
    a) Apply setting powder to the entire surface of the drum.
    b) Perform the drum initial setting (SP66).

    NOTE: This is not necessary at installation of a new machine as the drum initial setting is performed at the factory.

    c) Perform the Vsg adjustment (SP54).
11. Dispose of used drums according to local regulations.

1.3 CHARGE CORONA

1. Clean the corona wire by sliding the corona unit in and out. (The cleaner pads come into contact with the corona wire when the corona unit is slid all the way out.) The wire and casing can also be cleaned with water or dry cloth. Do not use any abrasives or solvents.
2. Do not touch the corona wire and the grid plate with oily hands. Oil stains may cause uneven image density on copies.
3. Make sure that the corona wire is correctly positioned between the cleaner pads and that there is no foreign material on the casing.
4. When adjusting the charge corona current, always make sure that the center of the drum shoe is aligned with the middle of the corona wires.
5. Clean the charge grid with a blower brush (not with a cloth).
6. The corona height should only be adjusted in the following two cases:
    a) When the front end block is replaced
    b) When the drum charge current is uneven

1.4 OPTICS

1. The position of following parts are very difficult to adjust. Do not adjust them.
   a) 4th/5th Mirror Home Position Sensor
   b) Lens Home Position Sensor
   c) Lens and 4th/5th Mirror Guide Rails

   NOTE: Before removing a sensor bracket to replace a sensor, mark the position of the bracket. Check the copy image (magnification and focus)to confirm that the sensor bracket has been properly repositioned.
2. Clean the exposure glass with glass cleaner and a dry cloth to reduce the amount of static electricity on the glass surface.
3. When reinstalling the exposure glass, make sure that the red mark on the edge of the glass is positioned on the right hand side facing upward. This side has received a special treatment to make it smoother and generate less static electricity. This is especially important when the DF is installed.
4. Clean the following parts with a dry cloth:
   a) Lens and 4th/5th Mirror Guide Rails
   b) Scanner Guide Plates
5. Only use a clean soft cloth damped with alcohol or water to clean the mirrors and lens.
6. Do not touch the following parts with your bare hands:
   a) Reflectors
   b) Exposure Lamp
   c) Mirrors and Lens
7. Whenever one of the actions listed below needs to be performed, all the following actions must be done in order.
   a) Optics cleaning
   b) SP95 (V_L Correction Reset)
   c) SP48 (Light Intensity Adjustment)
   d) SP56 (ADS Reference Voltage Adjustment)
8. Do not adjust VR401 on the AC drive board.

1.5 DEVELOPMENT

1. Be careful not to nick or scratch the development roller sleeve.
2. Place the development unit on a sheet of paper after removing it from the copier. This prevents any small metal objects (staples, paper clips, E-rings, etc.) from being attracted to the development roller and getting inside the unit.
3. Never loosen the two screws securing the bias terminal block. The position of the terminal block is set with a special tool and instrument at the factory to ensure the proper gap between the drum and the development roller.
4. Never loosen the three screws securing the doctor plate and the four screws securing the doctor plate mounting bracket. The position of the doctor plate is set with a special tool at the factory to ensure the proper gap between the doctor blade and the development roller.
5. Clean the drive gears after removing used developer.
6. Developer initial setting (SP65) is necessary when the developer is replaced.
7. Dispose of used developer according to local regulations.
8. When installing new developer or manually rotating the development roller, always make sure to turn the gears in the direction shown in Sec. 5 (Developer Replacement). The copier might be damaged if they are turned in the opposite direction.

1.6 TONER SUPPLY

1. Clean the image density sensor with a blower brush.
2. Do not touch the sensor pattern with bare hands.
3. Image density sensor adjustment (Vsg Adjustment [SP54]) is required in the following cases:
   a) When the image density sensor is replaced
   b) When the main board is replaced
   c) When the drum has been replaced and Vsg is out of specification
   d) When there have been problems with toner supply and Vsg is out of specification

1.7 TRANSFER AND SEPARATION

1. Clean the corona wires and casing with water or dry cloth.
2. When adjusting the corona current, always make sure that the center of the drum shoe is aligned with the corona wire.

1.8 CLEANING UNIT

1. Be careful not to damage the edge of the cleaning blade.
2. After installing a new cleaning blade, be sure to apply setting powder evenly on the surface and edge of the blade.
3. The bottom plate of the cleaning unit may be hot from the heat of the fusing unit. Remove the unit by supporting your left hand on the cushion attached under the bottom plate.
4. When inserting the cleaning unit into the copier, be sure that the cleaning unit rail is properly engaged with the unit guide rail on the copier.
5. Empty the used toner tank every service call and clear the toner end counter (SP58) by SP83 (toner end counter clear). Especially, since the FT3013 copier does not have side erasing by the erase lamp, the used toner tank may become full in a faster period than expected under certain conditions.
6. Do not perform toner end counter clear (SP83) without emptying the used toner tank.
7. Dispose of used toner according to local regulations.

1.9 FUSING UNIT

1. Be careful not to damage the edges of the hot roller strippers or their tension springs.
2. Do not touch the fusing lamp with bare hands.
3. Make sure that the fusing lamp does not touch the inner surface of the hot roller.

1.10 PAPER FEED

1. Do not touch the feed and relay rollers with oily hands.
2. A worn out registration roller can crease paper. Worn rollers should be replaced.
3. The side fences and the end fence of the paper tray should be positioned correctly so that they securely hold the paper. Otherwise, paper misfeeds may occur.

1.11 DOCUMENT FEEDER

1. When installing or removing the document feeder, make sure that the document feeder is in the open position.
2. A build-up of static electricity on the exposure glass can cause originals to misfeed. Apply a small amount of silicon oil to the glass using a clean cloth lightly dampened with silicon oil. This will reduce the amount of friction.

1.12 OTHERS

1. When replacing the main board, remove the RAM pack from the old main board and place it on the new main board. Then install the new main board in the copier.
2. After installing a new main board with a **new** RAM pack, the Clear All Memory (SP99) procedure (see page 4-10) must be performed. (Do not perform SP99 if you have placed the old RAM pack on the new main board.)
3. Never perform SP99 (Clear All Memory) except for the following two cases:
   a) When the copier malfunctions due to a damaged RAM pack.
   b) When replacing the RAM pack.
4. Whenever SP99 (Clear All Memory) is performed, all the steps of the procedure must be followed. Otherwise, copy quality might be seriously affected.
5. When replacing a sensor, do not overtighten the screws. This may damage the sensor.
6. If a customer reports that red image areas on the original do not appear on the copy, instruct the customer to select the desired image density by the Manual Image Density keys.

7. Tighten securely the screws used for grounding the following PCBs when reinstalling them.
   - AC Drive Board
   - DC Power Supply Board
   - TC/SC Power Pack
   - CC/Grid/Bias Power Pack

8. The RAM pack must be handled as follows:

WARNING: The RAM pack has a lithium battery which can explode if handled incorrectly. Replace only with the same type RAM pack. Do not recharge, or burn this battery. Used RAM pack must be handled in accordance with local regulations.

2. SERVICE PROGRAM MODE

2.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data and change modes or adjustment values.

2.1.1 Service Program Access Procedure

There are two ways to access an SP mode.

(1) By the operation panel
(2) By turning on DPS101-2 on the main board

All SP modes except for SP98, and SP99 can be accessed by key operation. When accessing SP98, and SP99, JPS101-C must be short-circuited.

Access Procedure 1–Using The Operation Panel

1. Turn on the main switch.
2. Enter "71" by using the numeral keys.
3. Press and hold the Clear/Stop key until a dot (•) appears in the top left corner of the Copy Counter and then release it.
4. Press the Clear/Stop key again and then press the Lighter key.

   NOTE: "5" will blink in the Copy Counter to show that the SP mode has been accessed.
5. Enter the desired SP mode number using the numeral keys. The SP mode numbers are given in the Service Program Mode Table.

   NOTE: "•" is displayed instead of "1" in the Copy Counter when SP mode numbers over "100" are entered. The maximum number is "127".
6. Press the Auto Image Density key to view the data.

   NOTE: To enter a different SP mode number, press the Auto Image Density key again.
7. To leave SP mode, open and close the front cover or turn the main switch off and on.

Access Procedure 2 - Using DPS101-2

1. Turn the main switch off.
2. Remove the upper rear cover and turn on DPS101-2, then turn on the main switch. "5" will blink in the Copy Counter.
3. Enter the desired SP mode number by the numeral keys. SP mode numbers are given in the Service Program Mode Table.
4. Press the Auto Image Density key to view the data.
5. To leave SP mode, turn off DPS101-2.

NOTE: To cancel an already entered SP mode, press the Auto Image Density key.

2.1.2 Change Adjustment Values or Modes

1. Follow the steps from 1 to 6 in Access Procedure 1 or the steps from 1 to 4 in access procedure 2.
2. The factory-set or the default setting will be displayed in the Magnification indicator (FT3213 copier) or in the Copy Counter (FT3013 copier).
3. Enter the desired value or mode using the numeral keys and then press the Auto Image Density key. (SP mode data are given in the Service Program Mode Table.)
4. To leave SP mode, open/close the front cover or turn off/on the main switch (Access Procedure 1) or turn off DPS 101-2 (Access Procedure 2).

2.1.3 Memory Clear Procedure

– Clear Counters (SP98) –

NOTE: This SP mode clears the following counters:

- SP88: PM Counter Display
- SP100: By-pass Feed Copies
- SP101: Paper Tray Copies
- SP103: Total Copies
- SP106: DF Originals
- SP110: Total Misfeeds
- SP111: Number of Misfeeds by Location
- SP120: Total Service Calls
- SP121: Optics Section Service Calls
- SP122: Exposure Lamp Service Calls
- SP124: Fusing Section Service Calls
- SP125: DF Communication Service Calls

1. Turn off the main switch.
2. Turn on DPS101-2 and short-circuit JPS101-C (Lower).
3. Turn on the main switch.
4. Enter "98" by the numeral keys and then press the Auto Image Density key to view data.
5. Enter "1" by the numeral key and then press the Auto Image Density key.

   NOTE: The data "1" blinks 4 times when the above procedure is completed.
6. Turn off the main switch.
7. Turn off DPS101-2 and open-circuit JPS101-C (Lower).

– Clear All Memory (SP99) –

CAUTION: Memory all clear mode (SP99) clears all the correction data for process control and software counters, and returns all the modes to the default settings. Normally, SP99 should not be used.

This procedure is required only when the copier malfunctions due to a damaged RAM Pack or when replacing the RAM Pack for any reason.

1. Turn off the main switch.
2. Turn on DPS101-2 and short-circuit JPS101-C (Lower).
3. Turn on the main switch.
4. Enter "99" by the numeral keys and then press the Auto Image Density key to view data.
5. Enter "1" by the numeral key and then press the Auto Image Density key.

   NOTE: The data "1" blinks 5 times when the above procedure is completed.
6. Clean the used toner tank since the toner end counter has been cleared. (See Used Toner Removal.)

CAUTION: Skipping this step will cause the used toner overflow condition not to be detected properly.

7. Replace the OPC drum with a new one. (See Drum Replacement.)

CAUTION: Since the drum motor rotation time (SP57) for the drum wear correction has been cleared, the old drum cannot be used. If the old drum is used after all memory is cleared, dirty background may occur.

8. Load new developer. (See Developer Replacement.)

   NOTE: Since the software counter for the development bias voltage in the toner detection cycle has been cleared, –20 volts will be applied to the development roller for the initial 499 copies.
9. Clean the optics, sensors, and inside of the copier if necessary.
10. Refer to the "FACTORY SETTING" table located inside the upper slit of the inner cover and enter the data for:
    (1) SP60: Standard Image Grid Voltage Setting
    (2) SP62: Standard ID Sensor Grid Voltage Setting

10. Perform the following SP modes in sequence:
    (1) SP66: Drum Initial Setting
    (2) SP65: Developer Initial Setting
    (3) SP48: Light Intensity Adjustment
    (4) SP56: ADS Voltage Adjustment
    (5) SP54: Vsg Adjustment
    (6) SP42: Registration Adjustment
    (7) SP41: Leading Edge Erase Margin Adjustment
    (8) SP43: Vertical Magnification Adjustment
    (9) SP44: Horizontal Magnification Adjustment (FT3213 copier only)
    (10) SP47: Focus Adjustment (FT3213 copier only)

11. Turn off the main switch.

12. Turn off DPS101-2 and open-circuit JPS101-C (Lower).

2.2 SERVICE PROGRAM MODE TABLE

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1. A "❒" after the mode name means that copies can be made while in the SP mode. (Copies can be made by pressing the Start key after pressing the Auto Image Density key.)
2. In the *Function* column, comments (extra information) are in italics.
3. In the *Data* column, the default value is printed in bold letters.
4. In some SP modes, data display is different between the FT3013 and FT3213 models because of the difference in the operation panel. After entering the desired SP mode number, refer to the notes written at the end of the table to correctly observe the displayed data. (Which note to refer is described inside the Function column.)

Mode No.		Function	Data
5	Exposure Lamp OFF ❒	Exposure lamp OFF Turn on DPS101-1, then press the Start key to start free run. Press the C/S key to stop free run. Press the Auto Image Density key in Ready mode to turn off this mode. *Use this mode for the scanner movement check. To save toner, remove the development unit.*	
6	Misfeed Detection Off ❒	Copies are made without misfeed detection. Press the Start key to make a copy. Press the Auto Image Density key in Ready mode to turn off this mode. *Use this mode to check whether the paper misfeed was caused by a sensor malfunction. The total counter increments when copies are made in this mode.*	
7	Aging Mode	Factory use.	
8	Input Check ❒	Displays the input data from sensors and switches.	For data, see page 4-20.
9	Output Check	Electrical components turn on.	For data, see page 4-21.
11	All Indicators ON	Turns on all the indicators on the operation panel. *To turn off the indicators, press the Auto Image Density key.*	
12	220-230V/240V Conversion	Selects 220-230 or 240 volts. ***If the rated voltage is 240V, this data must be changed to "1".*** *Refer to NOTE 2.*	**0: 220-230V** 1:240V
⇒ 14	Auto "OFF"	Auto-off mode can be selected	**0: 30 mins (default)** 1: 15 mins 2: 1 hour 3: 1.5 hours 4: 2 hours
15	Auto Reset Time (Energy Saver Mode)	Selects auto reset time of 1 or 3 minutes, or cancels this mode. *The copier automatically goes to the energy saver mode at the selected reset time when SP78 is set to "1".*	**0: 1 min.** 1: 3 min. 2: None
16	Count Up/Down	Selects count up or count down.	**0: Up** 1: Down
17	Open	No function.	
18	Reduce/Enlarge Key Function (FT3213 copier only)	Specifies whether reduction or enlargement is selected first when the Reduce/Enlarge key is pressed.	**0: Reduction** 1: Enlargement

SERVICE TABLES

Mode No.		Function	Data
19	ADS Priority	Specifies whether the copier defaults to ADS or manual mode when the main switch is turned on.	**0: ADS** 1: Manual
29	Fusing Temperature Control	Selects fusing temperature control mode. *After selecting the control mode and turning the main switch off/on, the fusing temperature control is changed.*	**0: ON/OFF control** 1: Phase control
30	Toner Supply Mode	Selects toner supply system. *See SP31/SP32 for toner supply amount.*	**0: Detect Mode** 1: Fixed Mode
31	Toner Supply Ratio (Detect Mode)	Determines how much toner is supplied in detect mode.	**0: 15%** 1: 7% 2: 30% 3: 60%
32	Toner Supply Ratio (Fixed Mode)	Determines how much toner is supplied in fixed mode.	**0: 7.0%** 1: 3.5% 2: 10.5% 3: 14.0%
33	ID Sensor Bias	Sets the bias voltage applied to the development roller for the ID Sensor Pattern. *0: Vo* *1: Vo+40V* *2: Vo–20V* *3: Vo–40V*	Toner Density **0: Normal (Vo)** 1: Low 2: High 3: Higher
34	ADS Level	Selects the image density level in ADS mode. *Data: 1* *Increases grid voltage (–40V). Development bias voltage is not changed.* *Data: 2* *Increases development bias voltage (–40V). Grid voltage is not changed.*	**0: Normal** 1: Darker 2: Lighter
35	ID Detection Interval	ID sensor check is performed every 5 copies or 10 copies. *If low image density occurs in the near end condition, change the data to "1".*	**0: 10 copies** 1: 5 copies
37	Image Bias Adjustment	Adjusts image bias output if the image density at level 4 cannot be adjusted by Light Intensity adjustment (SP48). *0: Vo* *1: Vo+40V* *2: Vo+20V* *3: Vo–20V* *4: Vo–40V*	**0: Normal (Vo)** 1: Darkest 2: Darker 3: Lighter 4: Lightest
39	Exposure Lamp ON	Factory use.	
41	Lead Edge Erase Margin Adjustment ❒	Adjusts the lead edge erase margin. *0.4 mm per step. (–3.2 mm to +2.8 mm)*	0–15 **Default = 8**
42	Registration Adjustment ❒	Adjusts registration. *0.4 mm per step. (+3.2 mm to –2.8 mm)*	0–15 **Default = 8**
43	Vertical Magnification Adjustment ❒	Adjusts magnification in the paper travel direction. *0.2% per step. (–1.6% to +1.4%)*	0–15 **Default = 8**

Mode No.		Function	Data
44	Horizontal Magnification Adjustment (FT3213 copier only) ❒	Adjusts magnification perpendicular to the direction of paper travel. *0.2% per step. (–1.6% to +8.4%)*	0–50 **Default = 8**
45	Registration Buckle – Paper Feed ❒	Adjust the amount of paper buckle in registration area. *0.4 mm per step. (–3.2 mm to +2.8 mm)*	0–15 **Default = 8**
47	Focus Adjustment (FT3213 copier only) ❒	Adjusts the 4th/5th mirror position to correct focus. *This mode must be done after horizontal and vertical magnification adjustment (SP43 and 44).*	0–100 **Default = 40**
48	Light Intensity Adjustment ❒	Adjusts the exposure lamp voltage. *Before performing this mode, clean the optics and perform SP95. After performing this mode, perform SP56. The exposure lamp voltage is adjusted on the production line.* ***Refer to NOTE 3 for FT3013 copier.***	100–145 **Default = 126**
50	Image Bias Adjustment at ID Level 7 ❒	Adjusts image bias voltage at ID level 7. *0: Vo* *1: Vo+40V* *2: Vo–40V* *3: Vo–80V*	**0: Normal (Vo)** 1: Darker 2: Lighter 3: Lightest
51	Exposure Lamp Data Display	Displays the exposure lamp data with a reference number. *The exposure lamp, and optics cooling fans turn on for 10 seconds when the Auto Image Density key is pressed. Press the C/S key to turn this mode off. Do not repeat more than 5 times to avoid overheating the optics cavity.* ***Refer to NOTE 3 for FT3013 copier.***	100–150
52	Fusing Temperature Display	Displays the fusing temperature. ***Refer to NOTE 3 for FT3013 copier.***	
54	Vsg Display	Displays Vsg. *Adjust Vsg to 4.0 ± 0.2 V using VR102 on the main board. The main motor and the ID sensor LED turn on when the Auto Image Density key is pressed.* ***Refer to NOTE 4 for FT3013 copier.***	
55	Vsg & Vsp Display ❒	Displays the Vsg and Vsp readings. The Vsg reading is displayed while the "0" key is held down. FT3013 copier displays the Vsp reading while the "1" key is held down. To stop this mode, press the C/S key. *The Vsp and Vsg voltage readings are updated every 10 or 5 copies depending on SP35 selection. In free run mode, the Vsg and Vsp readings are updated every copy cycle.* ***Refer to NOTE 4 for FT3013 copier.***	

SERVICE TABLES

Mode No.		Function	Data
56	ADS Reference Voltage Display	Displays ADS reference voltage. *Before performing this mode, clean the optics, perform SP95 and SP48.* *After adjusting the light intensity (SP48), place 5 sheets of A3 (LDG) white paper on the exposure glass and select this mode. Adjust ADS voltage to 2.5 ± 0.1 V using VR101 on the main board.* ***Refer to NOTE 4 for FT3013 copier.***	
57	Drum Rotation Time	Displays the total time that the drum has rotated. *"Minute" is displayed first. Press and hold the Lighter key to display "Hour".*	
58	Toner End Counter	Displays the toner end condition count. *The toner end counter counts up 1 after 200 copies are made following toner cartridge replacement.*	
59	Open	No function.	
60	Standard Image Grid Voltage Setting	Factory use. Do not change data. ***Refer to NOTE 6.***	0–8 **Default = 4**
61	Standard ID Sensor Bias Voltage Setting	Factory use. Do not change data.	0–8 **Default = 2**
62	Standard ID Sensor Grid Voltage Setting	Factory use. Do not change data. ***Refer to NOTE 6.***	0–8 **Default = 4**
63	Open	No function.	
64	Toner Density Level Display	Displays the toner density level detected by initial setting (SP65). *Data Vsp/Vsg(%)* *0: 12–15* *1: 0–7* *2: 8–11* *3: 16–21* *4: 22–100*	0–4
65	Developer Initial Setting	Agitates new developer for about 5 minutes. "50" is displayed on the copy counter when the Auto Image Density key is held down. Press the Start key to start the initial setting. ***Initial setting must be done when new developer is installed.*** *The copier automatically returns to normal mode after initial setting is completed.*	
66	Drum Initial Setting	Used to set new drum condition. ***Initial setting must be done when a new drum is installed.*** *The Drum Rotation Time (SP57) and the OPC counter (SP69) are cleared.*	**0: No** 1: Yes

Mode No.		Function	Data
67	Vr Ratio Display	Displays the present Vr ratio. *L = Vrp/Vsg x 100* *L (%) Grid voltage* *100 to 84 Vo* *83 to 58 Vo–40V* *57 to 41 Vo–80V* *40 to 28 Vo–120V* *27 to 0 Vo–160V* ***Refer to NOTE 3 for FT3013 copier.***	0–100
68	Vr Forced Detection	Detects Vrp and perform Vr correction. *1. Turn off the DPS 101-2 after pressing the Auto Image Density key if it is on.* *2. Make 5 copies.*	**0: No** 1: Yes
69	OPC Counter	Shows the total number of copies made with the drum installed on the machine. ***Refer to NOTE 5.***	
78	Auto Energy Saver Mode	Selects the "Automatic Energy Saver" mode. The copier automatically goes to Energy Saver mode at the auto reset time selected (SP15).	**0: No** 1: Yes
79	Fusing Temperature Adjustment (Maximum temperature during copying)	Adjusts the maximum temperature of the hot roller during copying. 188°C to 202°C in 1°C steps. **Refer to NOTE 3 for FT3013 copier.**	188–202°C **Default=198°C**
80	Open	No function.	
83	Toner End Counter Clear	Clears the toner end counter (SP58). Resets the used toner overflow condition (E70) if it is detected. ***This mode must be performed when the used toner tank is cleaned.***	**0: No** 1: Yes
86	Energy Saving Ratio	Selects energy saving ratio. *The greater the saving ratio, the longer the waiting time until the copier returns to the ready condition.* *Saving Ratio Waiting Time* *0: 56% 25 sec.* *1: 47% 19 sec.* *2: 37% 12 sec.* *3: 25% 5 sec.*	**0: 56%** 1: 47% 2: 37% 3: 25%
87	PM Interval Setting	Sets the interval of the PM counter.	**0: No PM** 1: 40K 2: 60K 3: 80K 4: 100K
88	PM Counter Display	Displays contents of the PM counter. ***Refer to NOTE 5.*** *When the PM counter exceeds to the selected setting of SP87, the Magnification indicator (FT3213 copier) or the Copy Counter (FT3013 copier) blinks.*	
89	PM Counter Clear	Resets the PM counter. *Use this mode after performing PM.*	**0: No** 1: Yes

SERVICE TABLES

Mode No.		Function	Data
91	Optics Cooling Fan Operation (FT3013 copier only)	Enables the optics cooling fan (service option) operation as FT3213 copier. ***Refer to Section 6 for information.***	**0: No** 1: Yes
93	Maximum Copy Quantity	Limits the maximum copy quantity that can be entered.	1–**99**
95	VL Correction Reset	Resets the exposure lamp data and counter for the VL correction. *Before performing this mode, clean the optics parts. After performing this mode, perform SP48 and SP56.*	**0: No** 1: Yes
98	Clear Counters	Clear the following counters: • Copy Counters • SC Counters • Misfeed Counters • PM Counter *To clear, turn on DPS101-2 and short-circuit JPS101-C (Lower).*	**0: No** 1: Yes
99	Clear All Memory	Clear all counters and returns all modes to the default setting. *To clear, turn on DPS101-2 and short-circuit JPS101-C (Lower).*	**0: No** 1: Yes
100	By-pass Feed Copies	Displays the total number of copies fed from the by-pass feed table. ***Refer to NOTE 5.***	
101	Paper Tray Copies	Displays the total number of copies fed from the paper tray. ***Refer to NOTE 5.***	
102	Open	No function.	
103	Total Copies	Displays the total number of copies. ***Refer to NOTE 5.***	
106	DF Originals (FT3213 copier only)	Displays the total number of originals fed from the DF. ***Refer to NOTE 5.***	
110	Misfeeds (total)	Displays the total number of paper misfeeds. ***Refer to NOTE 5.***	
111	Number of Misfeeds by Location	Displays the total number of paper misfeeds in each area. Press the "1" key to select the desired number. ***Refer to NOTE 5.*** *"1" will be selected when the Auto Image Density key is pressed.* *1: Paper Feed* *2: Exit* *3: (Open)* *4: DF*	
120	Total Service Calls	Displays the total number of times the service call indicator has turned on.	
121	Optics Section Service Calls	Displays the total number of "optics section" service calls.	
122	Exposure Lamp Service Calls	Displays the total number of "exposure lamp" service calls.	
123	Open	No function.	

Mode No.		Function	Data
124	Fusing Section Service Calls	Displays the total number of "fusing section" service calls.	
125	DF Communication Service Calls	Displays the total number of "DF Timing Pulse Error" service calls.	
126	Open	No function.	
127	Open	No function.	

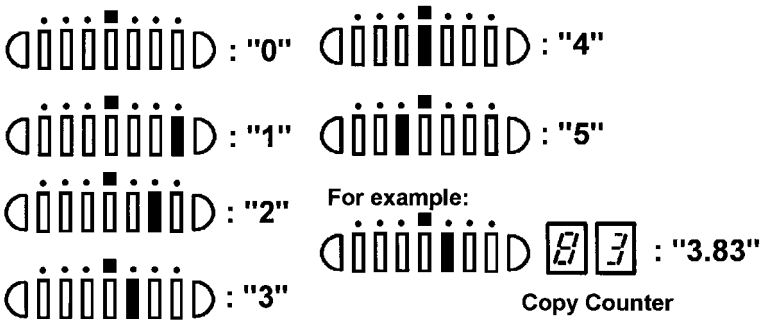
NOTE 1: 1) After the following SP mode numbers are entered, the copier goes automatically into copy mode when the Auto Image Density key is pressed:
SP mode numbers: 5, 6, and 55

2) After the following SP mode numbers are entered and the Auto Image Density key is pressed. Select the desired input numbers or SP mode data and press the Auto Image Density key.
SP mode numbers: 8, 37, 41, 42, 43, 44, 45, 47, 48, and 50

NOTE 2: When the data in SP mode 12 is changed from "0" to "1", CN421 on the ac drive board must be repositioned.

NOTE 3: The FT3013 copier displays the SP mode data in the Copy Counter. Since the Copy Counter has only 2 digits, "●" is displayed instead of "1" in the Copy Counter when the data exceeds "99".

NOTE 4: Make copies or perform free run to display the SP mode data. FT3013 copier displays the SP mode data in the Copy Counter. Since the Copy Counter has only 2 digits, the first digit is displayed in the Manual Image Density indicator as shown below (the decimal place is displayed in the Copy Counter):



NOTE 5: – FT3013 copier –
The FT3013 copier displays the SP mode data in the Copy Counter. The first two digits are displayed first. Press the Lighter key once to display the next two digits and press the Lighter key one more time to display the last two digits (six digits in total).
– FT3213 copier –
The first three digits are displayed in the Magnification Indicator. Press and hold the Lighter key to display the last three digits (six digits in total).

NOTE 6: Data will vary depending on factory setting. Refer to "FACTORY SETTING" table located on the upper inner cover.

2.3 SP MODE 8–INPUT CHECK

– How to check sensor/switch data –

1. Enter SP mode 8 as outlined in the service program access procedure. (pages 4-8 & 4-9). Be sure to press the Auto Image Density key after entering the SP number, as detailed on page 4-8 step 6 or 4-9 step 4.
2. Enter the desired number given in the following table.
3. Press the Auto Image Density key again.
4. Enter the number of copies and press the Start key.

NOTE: – FT3213 copier –
Either "0" or "1" is displayed in the Magnification Indicator.
– FT3013 copier –
Either nothing is displayed or "•" is displayed in the Copy Counter.

Number	Sensor/Switch/Signal	Data	
		"0" (FT3213 copier) or No display (FT3013 copier)	"1" (FT3213 copier) or "•" (FT3013 copier)
1	Registration Sensor	Paper not detected (HIGH)	Paper detected (LOW)
2	Exit Sensor		
3	Paper Tray Switch	Paper tray opened (HIGH)	Paper tray closed (LOW)
7	Relay Sensor	Paper not detected (HIGH)	Paper detected (LOW)
9	Optics Temperature	≥ 45°C	< 45°C
13	Scanner HP Sensor	Sensor actuated (HIGH)	Sensor not actuated (LOW)
14	Lens HP Sensor (FT3213 copier only)		
15	4th/5th Mirror HP Sensor (FT3213 copier only)		

2.4 SP MODE 9–OUTPUT CHECK

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– How to turn electrical components on/off –

1. Enter SP mode 9 as outlined in the service program access procedure. (pages 4-8 & 4-9)
2. Enter the desired number given in the following table.
3. Press the Start key to turn on the electrical component.

   NOTE: The start key may not light during this proceedure.
4. Press the Clear/Stop key to turn off the electrical component.

Number	Electrical Component
1	Main Motor + Quenching Lamp
2	Charge Corona + Standard Image Grid
3	Charge Corona + Standard ID Sensor Grid
4	Charge Corona + Standard Vrp Grid
5	Transfer Corona
6	Separation Corona
7	Main Switch (the machine will turn "OFF")
8	Erase Lamp
9	ID Sensor LED
11	Toner Supply Clutch + Main Motor
12	Registration Clutch
13	1st Paper Feed Clutch
15	Relay Roller Clutch
18	Exhaust Blower Motor
19	Optics Cooling Fan (FT3213 copier only)
20	Exposure Lamp + Optics Cooling Fan (FT3213 copier only)
22	Charge Corona + Image Grid with correction + Transfer Corona + Separation Corona
23	Charge Corona + ID Sensor Grid with correction + Transfer Corona + Separation Corona
24	Charge Corona + Vrp Grid with correction + Transfer Corona + Separation Corona
25	Charge Corona + Image Grid with correction
26	Charge Corona + ID Sensor Grid with correction
27	Charge Corona + Vrp Grid with correction
30–37	Development Bias Voltage in 40 volts steps starting at –120 volts
38	Development Bias Voltage = –500 volts
40–48	Grid Voltage in 60 volts steps starting at –400 volts

2.5 SERVICE CALL AND USER CODE TABLE

Service Call Code

E-code	Contents	SP Mode No. (SC Counter)
11	**Exposure Lamp Error** The feed back signal becomes higher than 4.2 volts (rms) for 1.0 second when the exposure lamp is on, or it becomes higher than 1.0 volt (rms) for 1.0 second when the exposure lamp is off.	SP122 (Exposure Lamp)
12	**Exposure Lamp Error** The feed back signal falls below 0.5 volt (rms) for 1.0 second when the exposure lamp is on, or the exposure lamp stays on for longer than 10 seconds.	
13	**Zero Cross Signal Error** The CPU does not receive the zero cross signal within 2.0 seconds.	–
21	**Scanner Home Position Error** The scanner home position sensor's output remains LOW (de-actuated) for 9 seconds after the main switch is turned on.	SP121 (Optics)
22	**Scanner Home Position Error** The scanner home position sensor's output remains HIGH (actuated) for 1.0 second after the scanner starts.	
28	**Lens Home Position Error** (FT3213 copier only) The lens home position sensor's output remains LOW (de-actuated) for 6.0 seconds after the lens moves to the home position.	
29	**Lens Home Position Error** (FT3213 copier only) The lens home position sensor's output remains HIGH (actuated) for 4.0 seconds after the lens leaves the home position.	
2A	**4th/5th Mirror Home Position Error** (FT3213 copier only) The 4th/5th mirror home position sensor's output remains LOW (de-actuated) for 3.0 seconds after the 4th/5th mirror assembly moves to the home position.	
2B	**4th/5th Mirror Home Position Error** (FT3213 copier only) The 4th/5th mirror home position sensor's output remains HIGH (actuated) for 4.0 seconds after the 4th/5th mirror assembly leaves the home position.	
40	**Optics Thermistor Error** The optics thermistor is defective (open).	
52	**Fusing Warm-up Error** The temperature detected by the thermistor does not reach 150°C within 45 seconds after the main switch is turned on.	SP124 (Fusing) **Refer to NOTE.**
53	**Fusing Overheat** The temperature detected by the thermistor becomes higher than 240°C.	
55	**Fusing Thermistor Open** The temperature detected by the thermistor does not reach 2°C within 20 seconds after the main switch is turned on.	

SERVICE TABLES

E-code	Contents	SP Mode No. (SC Counter)
70	**Used Toner Overflow** The overflow counter reached 80K copies or the toner cartridge was replaced 9 times.	–
96	**DF Timing Pulse Error** The DF CPU does not receive a DF timing pulse within 100 milliseconds.	SP125 (Document Feeder)

NOTE: When the E52, E53, or E55 conditions occur, for safety reason they cannot be cleared by turning off and on the main switch. The following procedure must be performed to clear these service call conditions:

1. Turn on the main switch.
2. Turn DPS 101-1 on and off.
3. Turn the main switch off and on.

User Code

U-code	Contents
2	Key Counter Not Set
U-O	Scanner not in Home Position

3. SERVICE TABLES

3.1 TEST POINTS

Copier Main Board

NUMBER	FUNCTION
TP102	HET (Fusing Thermistor)
TP103	GND
TP106	ADS (Auto Image Density Sensor) Adjust the voltage to +2.5 ± 0.1 volts by VR101.
TP107	AVSS (GND)
TP110	PSE (ID Sensor Voltage) Adjust the voltage to +4.0 ± 0.2 volts by VR102.
TP111	ETH (Optics Thermistor)
JP101	Key Counter (Cut this jumper wire when installing the key counter on the machine.)

DF Main Board

NUMBER	FUNCTION
TP1	Factory use
TP2	Factory use
TP3	GND
TP4	+5 volts
TP5	GND
TP6	+24 volts

3.2 DIP SWITCHES AND JUMPER SWITCHES

Copier Main Board

DIP SWITCH	NORMAL	FUNCTION
DPS101-1	OFF	Free run
DPS101-2	OFF	Service program mode access
JUMPER SWITCH	**NORMAL**	**FUNCTION**
JPS101-R (Upper)	Open	Factory use
JPS101-C (Lower)	Open	To clear counters by SP98 or to clear all memory by SP99

DF Main Board

SW1				FUNCTION	
1	2	3	4		
OFF	OFF	OFF	OFF	Normal (Factory setting)	Lift Switch must be ON
ON	OFF	OFF	ON	Free run (Insert paper)	
OFF	OFF	ON	ON	Solenoid test	
ON	ON	OFF	ON	Motor test	
ON	ON	ON	ON	All indicators ON	

3.3 VARIABLE RESISTORS

Copier Main Board

NUMBER	FUNCTION
VR101	Adjusts ADS voltage (+2.5 ± 0.1 volts)
VR102	Adjusts ID sensor voltage (+4.0 ± 0.2 volts)

CC/Grid/Bias Power Pack

NUMBER	FUNCTION
VR1	Adjusts charge corona current
VR2	Adjusts standard grid voltage
VR3	Adjusts standard development bias voltage

TC/SC Power Pack

NUMBER	FUNCTION
VRT	Adjusts transfer corona current
VRD	Adjusts separation corona current

AC Drive Board

NUMBER	FUNCTION
VR401	Adjusts base exposure lamp voltage (Factory use)

DF Main Board

NUMBER	FUNCTION
VR1	Adjusts original stop position (Factory use)

4. SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty
A0069105	Drum Shoe Shaft	1
A0069103	Scanner Wire Clamp (Omega Clamp)	1
A0069104	Scanner Positioning Pin (4 pcs)	1 set
A0089502	Grease G-40M	1
52039501	Grease (Shinetsu Silicone G-501)	1
54429106	Drum Shoe	1
54479104	Shoe Adapter	1
54209507	Digital Multimeter	1
54479078	Heat Resistance Grease (MT-78)	1
52149500	Test Chart OS-A4 (10 pcs/set)	
52149501	Test Chart OS-A4 (100 pcs/set)	
A0779505	Drum Shoe Shaft Adapter	1
54429101	Setting Powder	1

5. PREVENTIVE MAINTENANCE SCHEDULE

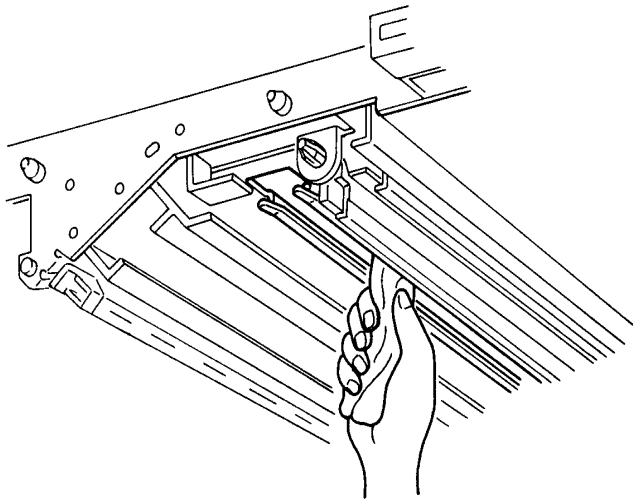
5.1 PM TABLE

R = Replace C = Clean I = Inspect

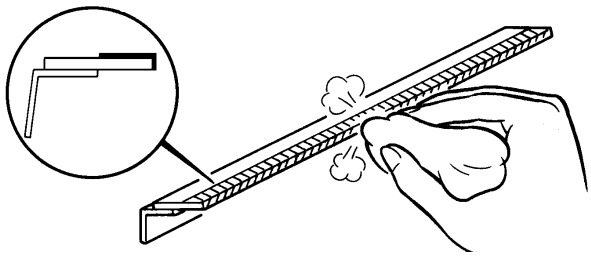
	EM	80K	160K	NOTES
OPTICS				
Mirrors, Lens, Reflectors	C	C	C	Silicone cloth, cotton pad with water, or blower brush **Refer to NOTE 1 to clean 6th mirror.**
Exposure Glass	C	C	C	Alcohol or water
Exposure Lamp	I	I	I	Replace if necessary.
Scanner Guide Rail		C	C	Dry cloth
Magnification Guide Rail		C	C	Dry cloth
Platen Cover Sheet	C	R	R	Dry cloth (Replace if necessary.)
AROUND DRUM				
ID Sensor	C	C	C	Blower brush
Pick-off Pawl	C	C	C	Dry cloth
Quenching Lamp	C	C	C	Dry cloth
Erase Lamp	C	C	C	Dry cloth
End Blocks and Casing	C	C	C	Water or dry cloth
Transfer Guide Plate	C	C	C	Dry cloth
Corona Wires	C	R	R	Water or dry cloth
Wire Cleaner	I	R	R	
Grid Plate		C	R	Blower brush
CLEANING UNIT				
Used Toner Tank	C	C	C	Empty used toner.
Cleaning Seal		C	C	Replace if necessary.
Cleaning Blade		R	R	Dust with setting powder after replacement or cleaning. **Refer to NOTE 2.**
DEVELOPMENT UNIT				
Developer		R	R	Replace if necessary.
Entrance Seal		C	C	
Drive Gears		C	C	
PAPER FEED				
Registration Roller		C	C	Water
Relay Roller		C	C	Water
Registration Sensor		I	I	

SERVICE TABLES

	EM	80K	160K	NOTES
Relay Sensor		I	I	
Paper Guide Plate		C	C	Dry cloth
Feed Roller	C	C	R	Water
Paper Tray Bottom Plate Pad		C	R	Water
FUSING UNIT				
Hot Roller		R	R	
Pressure Roller			R	
Stripper Pawls		I	I	
Fusing Entrance And Exit Guides		C	C	Suitable solvent
Fusing Thermistor	I	I	I	Suitable solvent (Clean if necessary.)
Fusing Lamp	I	I	I	Confirm the temperature by SP52. Replace if necessary.
OTHERS				
Exit Roller		C	C	Water
Exit Sensor		I	I	
Ozone Filter		R	R	
Timing Belts		I	I	
DOCUMENT FEEDER	PM intervals: number of originals fed (SP106)			
Transport Belt	C	C	C	Belt cleaner
Friction Belt	C	C	R	Water
Pick-up Roller	C	C	C	Water
Feed Roller	C	C	C	Water



NOTE 1: Clean the 6th mirror with silicone cloth as shown. After cleaning the optics section, SP95, SP48 and SP56 **MUST** be performed and in the order given.



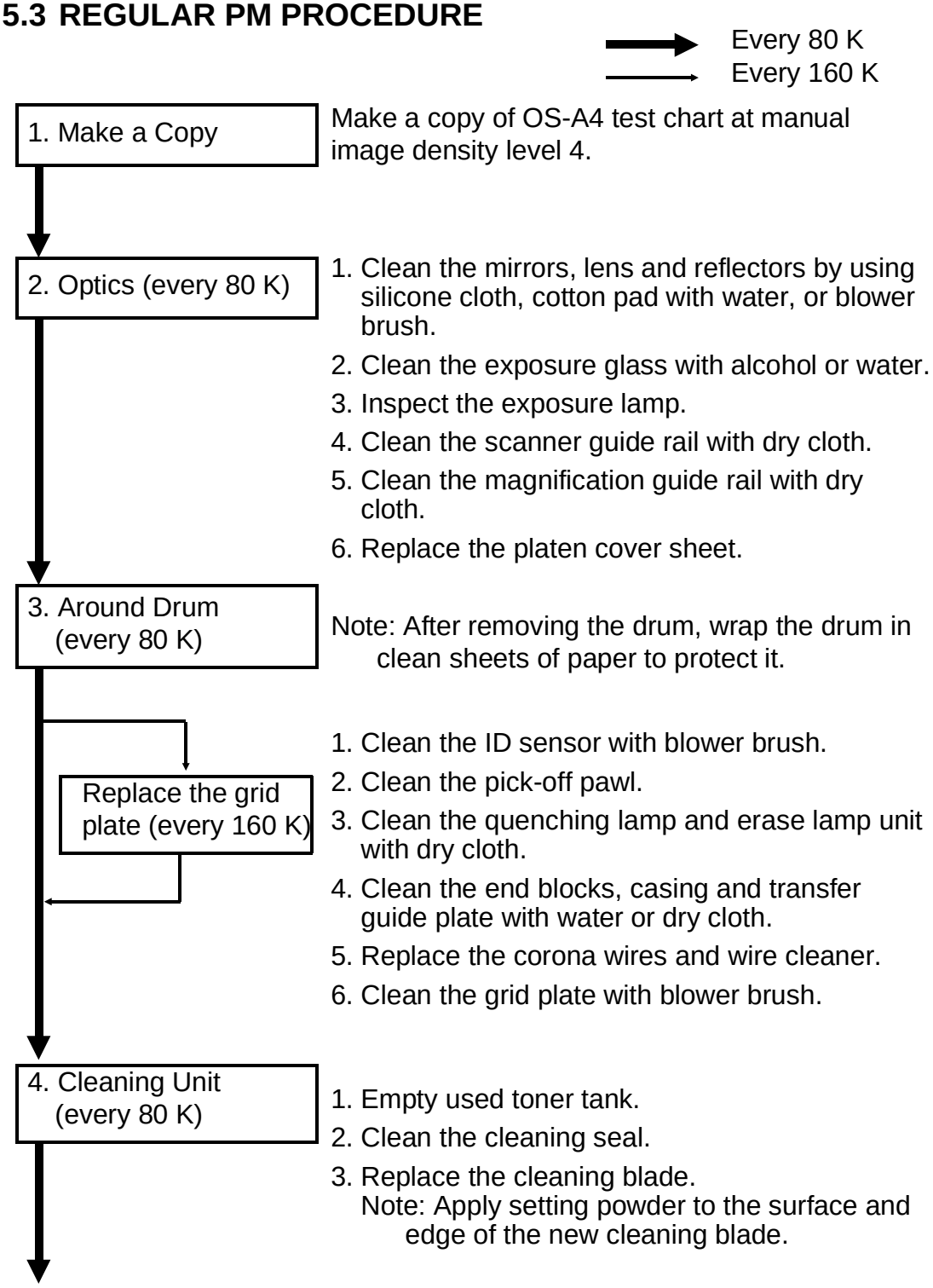
NOTE 2: Apply setting powder evenly on the surface and edge of the blade as shown to prevent damaging the drum.

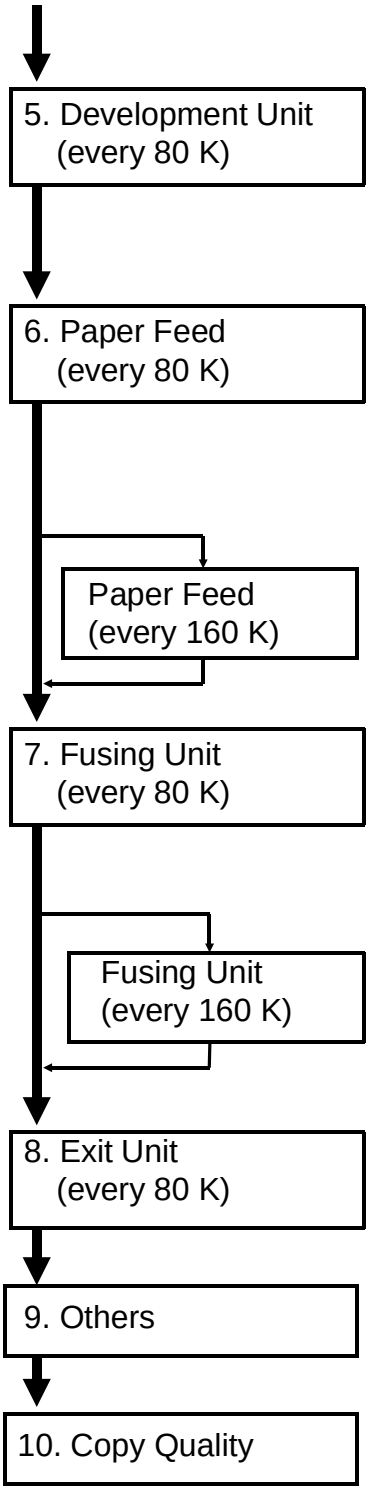
5.2 EXPLANATION OF REGULAR PM

Item		Explanation
Optics Unit	Mirrors, Lens, Reflector, Exposure Glass, Platen Cover	Stains on any part of the optics unit result in a dirty background, black lines, black spots, or areas of decreased sharpness on the copy image. Periodic cleaning is required. The exposure glass and the platen cover must also be cleaned. If stains on the platen cover cannot be removed, it must be replaced.
	Exposure Lamp	Deterioration of the exposure lamp affects the copy image. Inspect the lamp at regular intervals and replace if discolored.
Paper Feed, and Registration	Feed Roller	If paper powder or dust adheres to the feed rollers and/or rollers are worn out, paper may not feed correctly and/or skewing may result. Cleaning or replacement is required at regular intervals.
	Registration Roller	A dirty registration roller can cause paper to register incorrectly, skew, or misfeed. Cleaning is required at regular intervals.
Transport	Transfer Guide Plate	If the transfer guide plate is dirty, the back side of copies may become dirty. Clean the plate at regular intervals.
Around Drum	Charge Wires	Dirty charge wires may cause uneven image density. They should be cleaned or replaced at regular intervals.
	End Blocks	Toner tends to accumulate on the corona end blocks, and this can result in poor copy quality or even a high voltage leak. Clean end blocks at regular intervals.
	QL	If toner accumulates on the QL, a dirty background or a repeating negative image may result. Clean the QL at regular intervals.
	ID Sensor	If paper dust or toner accumulates on the ID sensor, the toner density cannot be controlled correctly. This results in light copy or overtorning. Clean this sensor at regular intervals.
	Erase Lamp	If toner accumulates on the erase lamp, a dirty background may occur that becomes progressively worse in long copy runs. Clean this lamp at regular intervals.
Cleaning Unit	Cleaning Blade	A dirty or worn out cleaning blade will cause black lines on copies and/or scratches on the drum. The blade must be replaced or cleaned at regular intervals. To avoid damaging the drum, dust with setting powder evenly along the edge and surface of the blade after replacement or cleaning.
	Used Toner Tank	If the used toner tank becomes full, "E70" lights and copying becomes inhibited. To prevent unnecessary EM calls, the used toner tank should be emptied at every visit.

Item		Explanation
Fusing Unit	Thermistor	If toner accumulates on the thermistor, fusing temperature control may not be accurate. Inspect the thermistor at regular intervals.
	Stripper Pawls	Toner or dust adhering to the stripper pawls can cause a paper jam. Clean or replace the pawls at regular intervals. Inspect the movement as well.
	Fusing Entrance and Exit Guides	Toner piling up on the guide plate will cause a dirty background on the copy. Clean the guide plate at regular intervals.
DF	Transport Belt	A dirty transport belt can leave stains on copies. Clean or replace the belt at regular intervals.
	Pick-up Roller, Separation Roller, Separation Belt	When dirty, these rollers and this belt can leave stains on the copy paper. Clean or replace these parts at regular intervals.

5.3 REGULAR PM PROCEDURE


Every 80 K
Every 160 K
1. Make a Copy
Make a copy of OS-A4 test chart at manual image density level 4.
2. Optics (every 80 K)
1. Clean the mirrors, lens and reflectors by using silicone cloth, cotton pad with water, or blower brush.
2. Clean the exposure glass with alcohol or water.
3. Inspect the exposure lamp.
4. Clean the scanner guide rail with dry cloth.
5. Clean the magnification guide rail with dry cloth.
6. Replace the platen cover sheet.
3. Around Drum (every 80 K)
Note: After removing the drum, wrap the drum in clean sheets of paper to protect it.
Replace the grid plate (every 160 K)
1. Clean the ID sensor with blower brush.
2. Clean the pick-off pawl.
3. Clean the quenching lamp and erase lamp unit with dry cloth.
4. Clean the end blocks, casing and transfer guide plate with water or dry cloth.
5. Replace the corona wires and wire cleaner.
6. Clean the grid plate with blower brush.
4. Cleaning Unit (every 80 K)
1. Empty used toner tank.
2. Clean the cleaning seal.
3. Replace the cleaning blade.
Note: Apply setting powder to the surface and edge of the new cleaning blade.



1. Remove the old developer.
2. Clean the entrance seal.
3. Clean the drive gears on the development unit.
4. Install the new developer.

1. Clean the registration roller and relay roller.
2. Inspect the registration and relay sensor movement.
3. Clean the paper guide plate.
4. Clean the feed rollers and paper tray bottom plate pad.

1. Replace the feed rollers and paper tray bottom plate pads.

1. Replace the hot roller.
2. Inspect the fusing lamp.
3. Inspect the thermistor.
4. Clean and inspect the stripper pawls.
5. Clean the entrance and exit guide.

1. Replace the pressure roller.

1. Clean the exit roller.
2. Inspect the exit sensor movement.
3. Replace the ozone filter.

1. Inspect all the timing belts.

1. Reset the V_L correction counter by SP95.
2. Perform the drum initial setting by SP66 if the drum was replaced.
3. Perform the developer initial setting by SP65.
4. Adjust the exposure lamp intensity by SP48.
5. Adjust the ADS voltage by SP56.
6. Adjust the Vsg by SP54.
7. Reset the toner end counter (SP58) by SP83.

6. DEFECTIVE COMPONENT TABLES

6.1 DEFECTIVE SENSOR TABLE

Component	Condition	Symptom
Scanner Home Position Sensor (S1)	Stays HIGH (CN103-11)	SC code (E22) is displayed.
	Stays LOW (CN103-11)	SC code (E21) is displayed.
Lens Home Position Sensor (S2) (A152 copier only)	Stays HIGH (CN103-8)	SC code (E29) is displayed.
	Stays LOW (CN103-8)	SC code (E28) is displayed.
4th/5th Mirror Home Position Sensor (S3) (A152 copier only)	Stays HIGH (CN102-2)	SC code (E2B) is displayed.
	Stays LOW (CN102-2)	SC code (E2A) is displayed.
Registration Sensor (S4)	Stays HIGH (CN117-2)	The "Check Paper Path" indicator and "J1" indicator light when a copy is made.
	Stays LOW (CN117-2)	The "Check Paper Path" indicator and "J1" indicator light when the main switch is turned on.
Exit Sensor (S5)	Stays HIGH (CN116-2)	The "Check Paper Path" indicator and "J2" indicator light when a copy is made.
	Stays LOW (CN116-2)	The "Check Paper Path" indicator and "J2" indicator light when the main switch is turned on.
Relay Sensor (S6)	Stays HIGH (CN117-6)	The "PE" indicator lights when a copy is made.
	Stays LOW (CN117-6)	The "J1" indicator stays on when the main switch is turned on although there is no copy paper on the by-pass feed table.
Image Density Sensor (ID Sensor) (S7)	Stays HIGH (CN112-1)	The CPU detects an ID sensor abnormal condition. The ADS or Manual Image Density indicators start blinking.
	Stays LOW (CN112-1)	

6.2 DEFECTIVE SWITCHES OR OTHER ELECTRICAL COMPONENTS

Component	Condition	Symptom
Main Switch (SW1)	OPEN	The copier does not turn on.
	SHORT	The copier does not turn off.
Front Cover Safety Switch (SW2)	OPEN	The copier does not turn on.
	SHORT	The copier does not turn off when the front or exit cover is opened.
Paper Tray Switch (SW3)	OPEN	The Start key stays red even when the 1st paper tray is closed.
	SHORT	The Start key stays green even when the 1st paper tray is open, and the "J1" indicator lights after the Start key is pressed.
Exposure Lamp (L1)	OPEN	SC code (E11) is displayed.
Fusing Lamp (L2)	OPEN	SC code (E52) is displayed.
Fusing Thermistor (TH1)	OPEN	SC code (E55) is displayed.
	SHORT	SC code (E53) is displayed.
Fusing Thermoswitch (TS)	OPEN	SC code (E52) is displayed.
Optics Thermofuse (TF)	OPEN	SC code (E11) is displayed.
Optics Thermistor (TH2)	OPEN	SC code (E40) is displayed.
	SHORT	The Energy Saver Function key blinks.

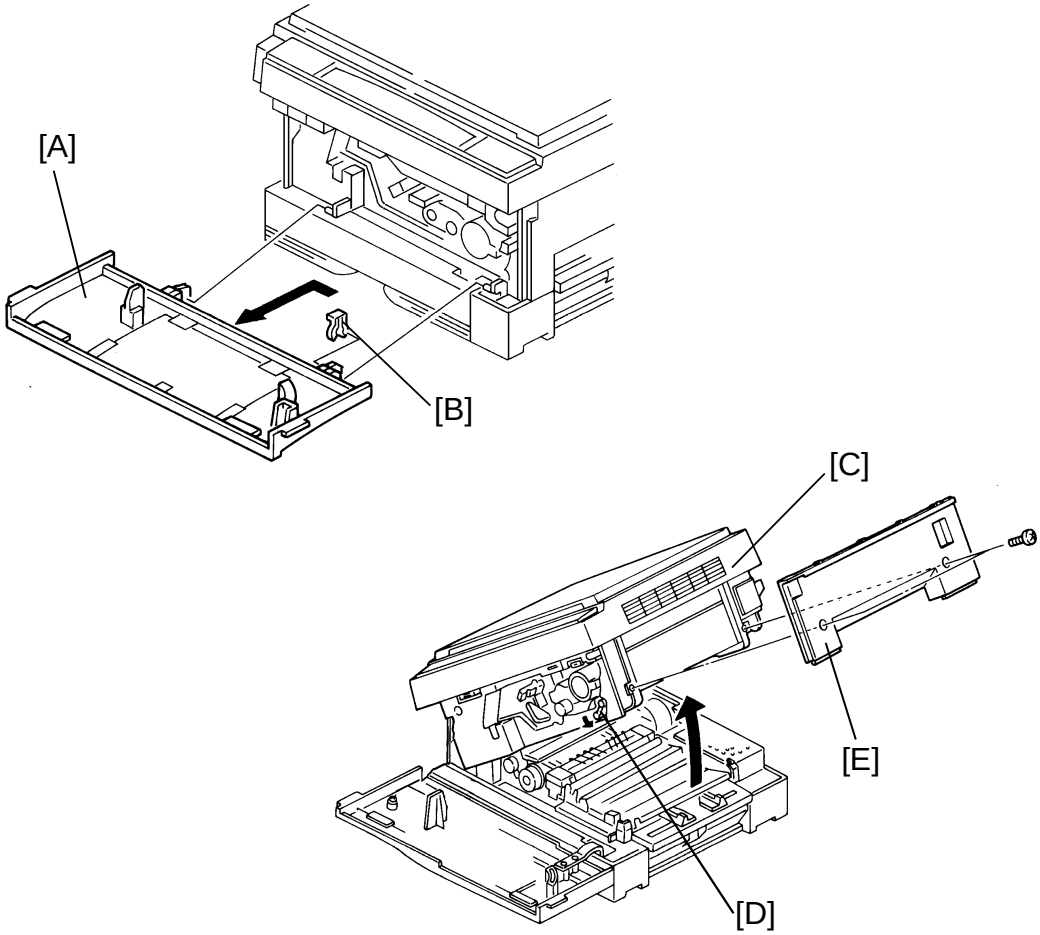
6.3 OPEN FUSE & CIRCUIT BREAKER TABLE

Component	Circuit	Symptom
FU201 (250 V/2 A) (dc power supply board)	+5 V (VC) power supply	The copier does not turn on even when the main switch is turned on.
FU202 (250 V/4 A) (dc power supply board)	+24 V (VA) power supply	The copier displays E22 on the operation panel.
FU401 (125 V/15 A) (ac drive board) ... 115 V machine only	Front door safety	The copier does not turn on even when the main switch is turned on.
FU402 (250 V/6.3 A) (ac drive board) ... 220~230 V/240 V machine only	Front door safety	The copier does not turn on even when the main switch is turned on.
F1 (250 V/2 A) (DF main board)	DC power supply for the DF	The DF does not turn on even when the main switch is turned on.
FU101 (250 V/2 A) (Between CN418 on the ac drive board and CN1 of the DF connector) ... 220~230 V/240 V machine only	AC power supply for the DF	The DF does not turn on even when the main switch is turned on.
Circuit Breaker ... 220~230 V/240 V machine only	AC power supply	The copier does not turn on even when the main switch is turned on.

REPLACEMENT
AND
ADJUSTMENT

1. EXTERIOR AND INNER COVERS

1.1 EXTERIOR COVER REMOVAL



1.1.1 Front Cover

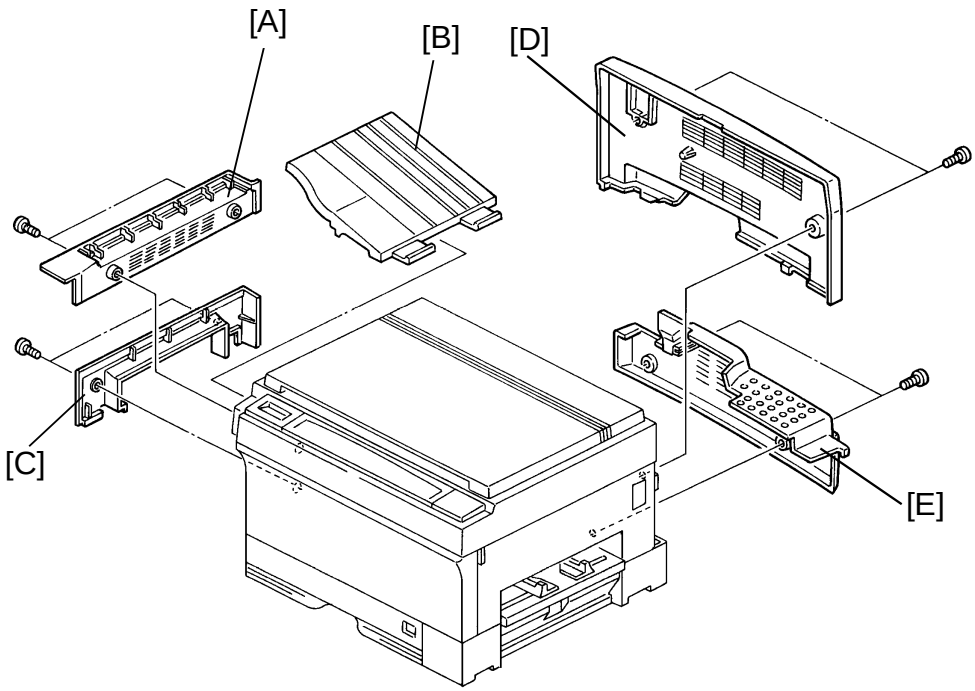
1. Open the front cover [A].
2. Remove the front cover (1 snap ring [B]).

1.1.2 Right Cover

1. Open the front cover.
2. Open the upper unit [C] by pushing the release lever [D].
3. Remove the right cover [E] (2 screws).

NOTE: The upper unit can lift with force. Be sure to support the upper unit with one hand while pushing the release lever with your other hand.

REPLACEMENT AND ADJUSTMENT



1.1.3 Upper Left Cover

1. Remove the upper left cover [A] (2 screws).

1.1.4 Lower Left Cover

1. Take out the copy tray [B].
2. Remove the lower left cover [C] (2 screws).

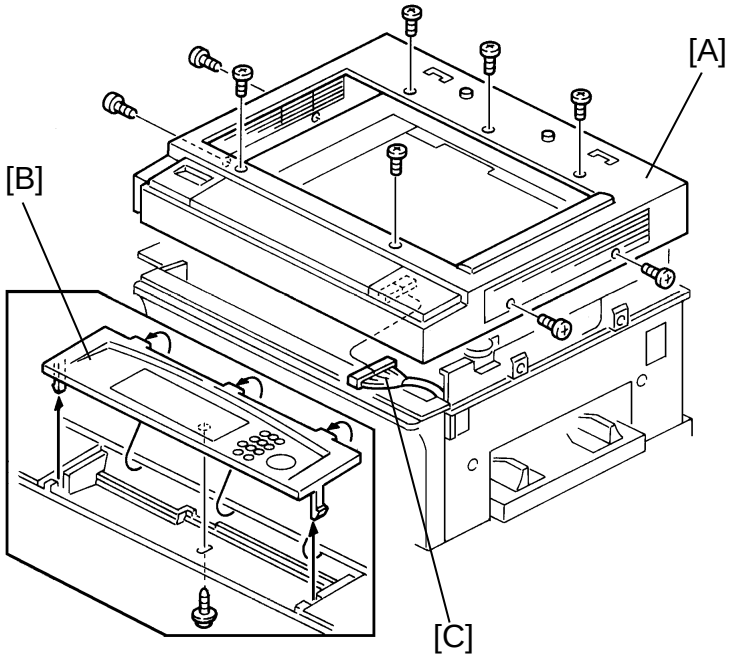
1.1.5 Upper Rear Cover

1. Remove the upper rear cover [D] (2 screws).

1.1.6 Lower Rear Cover

1. Remove the upper rear cover (2 screws).
2. Remove the lower rear cover [E] (2 screws).

1.1.7 Upper Cover

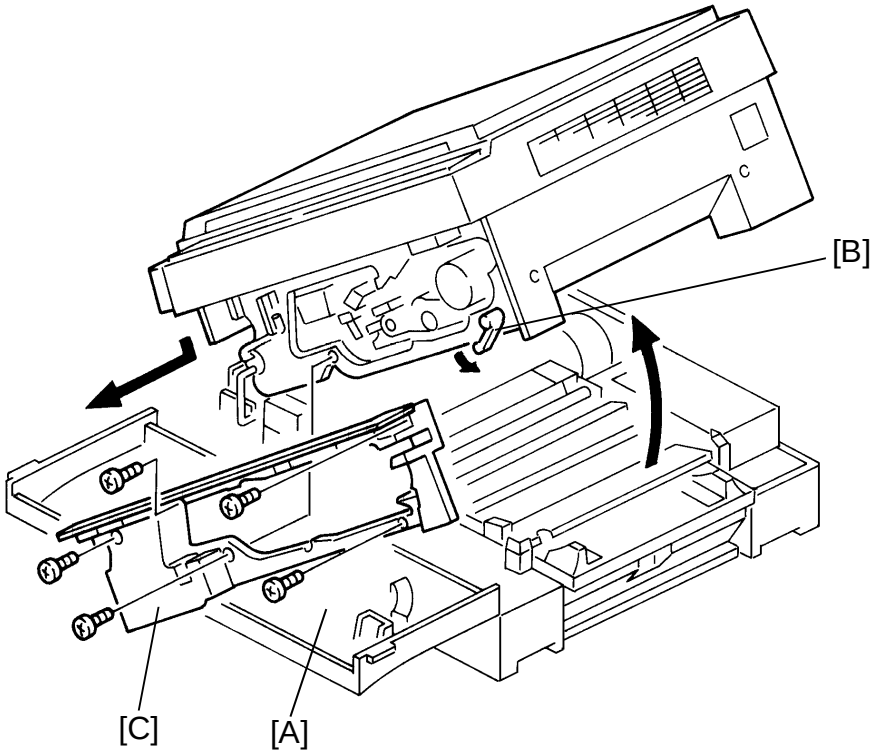


1. Remove the platen cover or DF.
2. Remove the left side scale (2 screws).
3. Remove the exposure glass. (See Exposure Glass Removal.)
4. Remove the upper rear cover (2 screws).
5. Remove the upper cover [A] with the operation panel [B] (9 screws and 2 connectors).
6. Remove the operation panel from the upper cover as shown. (1 screw and 2 hooks).

NOTE: When reinstalling the operation panel, make sure to do the following:

1. Pass the operation panel harness [C] through the hole and connect the 2 connectors before reinstalling the operation panel.
2. Insert the rear side of the operation panel into the upper cover, and then push in the front side.

1.2 INNER COVER REMOVAL

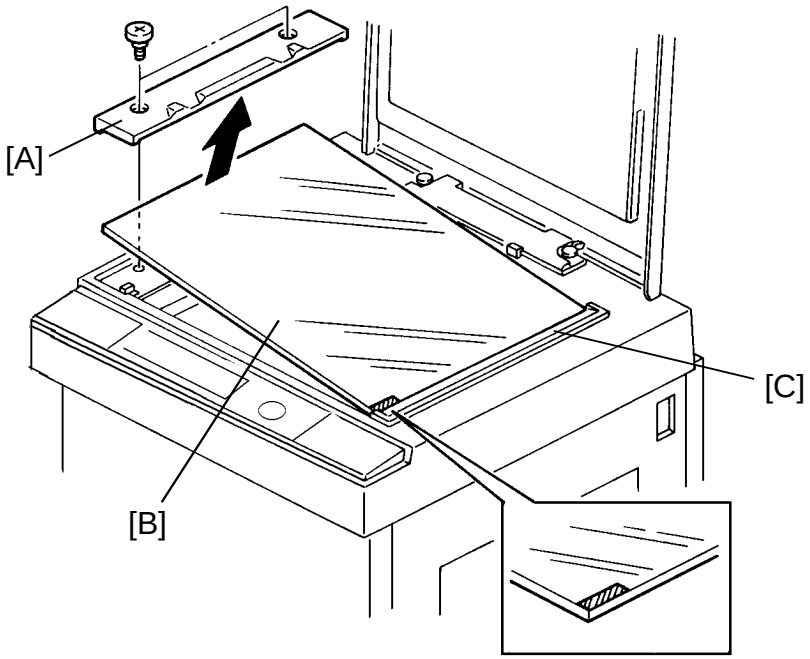


1. Open the front cover [A].
2. Open the upper unit by pushing the release lever [B].

   NOTE: The upper unit can lift with force. Be sure to support the upper unit with one hand while pushing the release lever with your other hand.
3. Remove the inner cover [C] (5 screws) as shown.

2. OPTICS

2.1 EXPOSURE GLASS REMOVAL



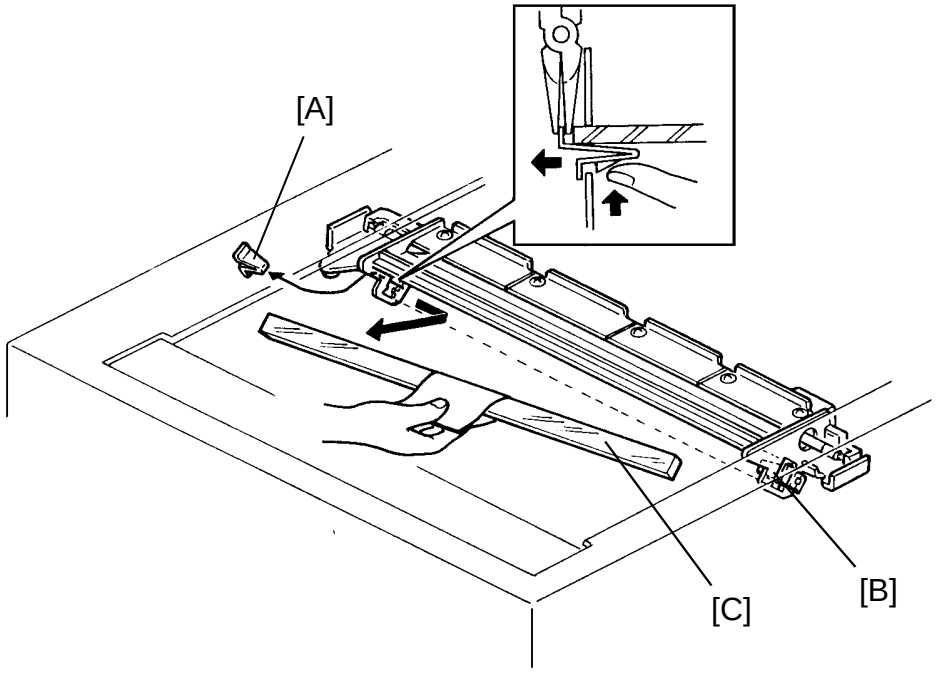
1. Take off the left scale [A] (2 shoulder screws).
2. Grasp the left edge of the exposure glass [B] and lift it up slightly. Slide the other edge out from under the right glass holder [C]. Remove the exposure glass.

   NOTE: When reinstalling the exposure glass, make sure of the following:

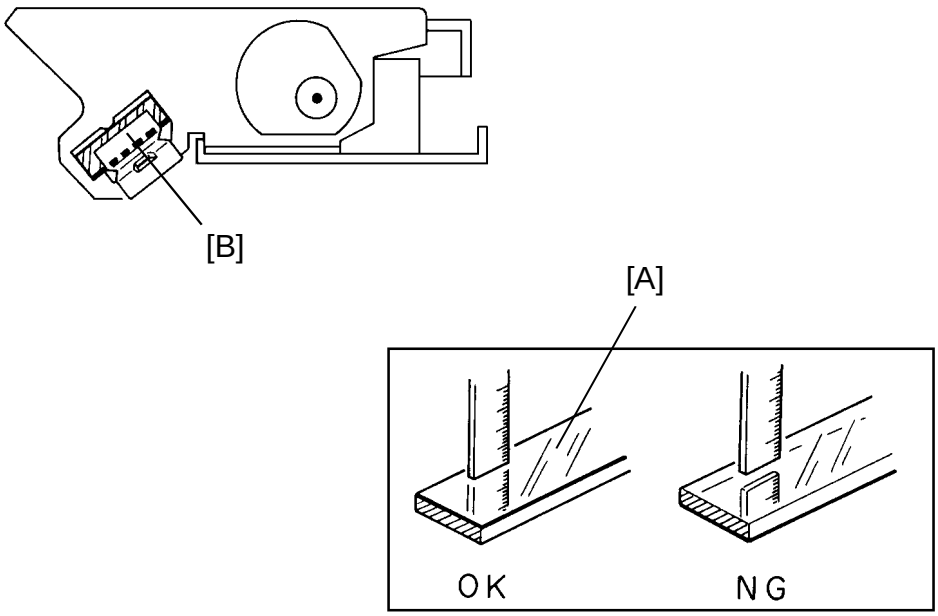
   a) The left edge of the glass is flush with the tab to the left of the scale plate, and the right glass holder firmly secures the exposure glass.

   b) The red mark is positioned on the right hand side facing upwards. This side is smoother and generates less static electricity when the DF is used.

2.2 1ST MIRROR REMOVAL



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the cutout position (150 mm from the left scale).
4. Move the 1st scanner to the front side. Then, while holding the scanner, press up on the rear spring plate [A] with a finger and remove the plate with a pair of pliers. Leave the front spring plate [B] in position in the rear side plate cutout.
5. Carefully slide the 1st mirror [C] toward the front of the machine and lift the mirror out of the machine rear side first.



– To reinstall –

1. Insert the 1st mirror into the rear side plate cutout. Then insert the front side of the mirror into the front spring plate.

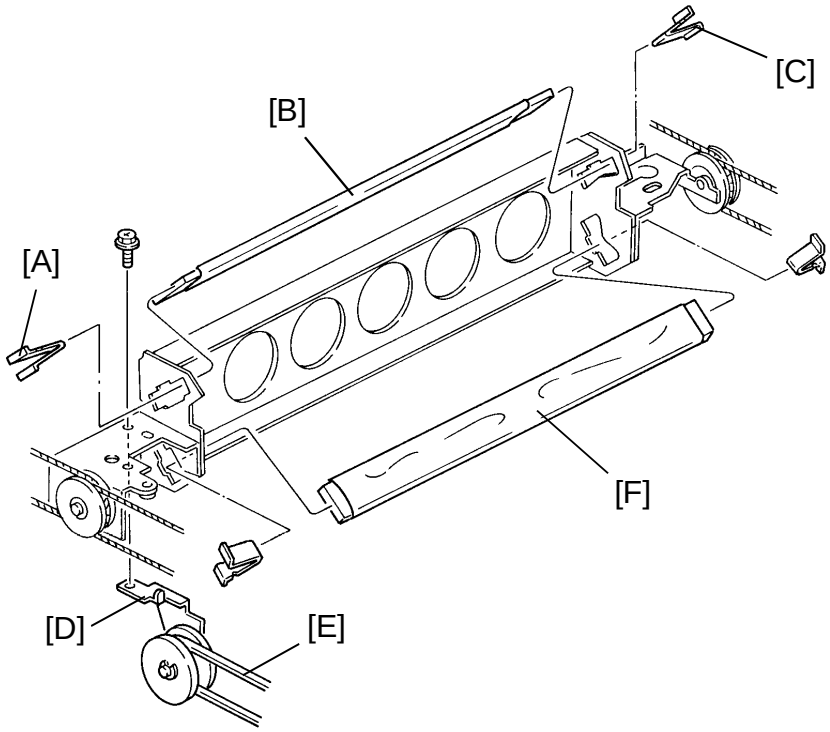
   NOTE: Make sure when installing the mirror that the reflecting surface [A] is on the upper side as shown.

2. Insert the rear spring plate between the mirror and the rear side plate cutout.

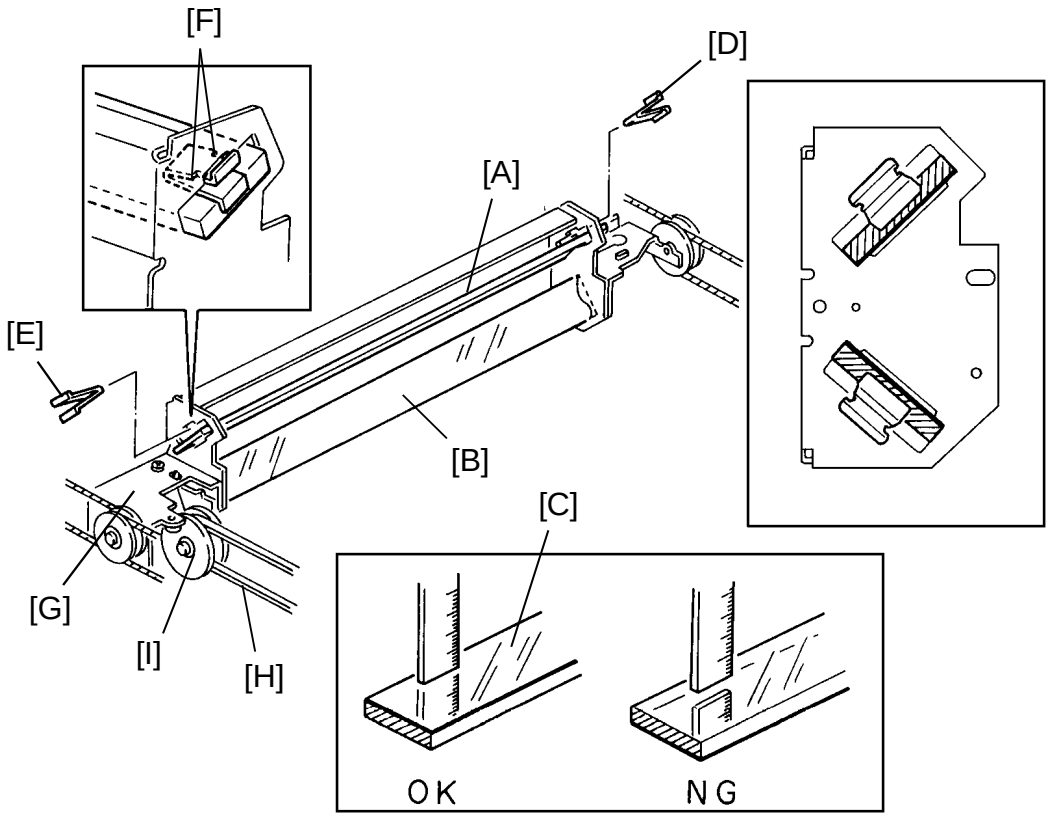
   NOTE: Make sure that spring plate [B] is positioned correctly as shown.

3. Clean the optics components and perform the necessary SP modes (SP95, SP48, and SP56).

2.3 2ND AND 3RD MIRROR REMOVAL



1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Slide the 1st scanner two thirds of the way to the right.
4. Remove the front spring plate [A] of the 2nd mirror [B].
5. Carefully shift the 2nd mirror toward the front of the machine to remove the rear spring plate [C].
6. Lift the 2nd mirror out of the machine.
7. Remove the pulley bracket [D] of the exposure lamp harness [E] (1 screw).
8. Remove the 3rd mirror [F] in the same way as the 2nd mirror.



– To reinstall –

1. Position the 2nd mirror [A]/3rd mirror [B] in the front and rear side plate cutouts.

   NOTE: Make sure that the reflecting surface [C] faces the lens.

2. Set the rear spring plate [D] in the rear side plate cutout while holding the mirror and set the front spring plate [E] in the front side plate cutout.

   NOTE: a) Make sure that the notches [F] in the spring plate are positioned as shown.

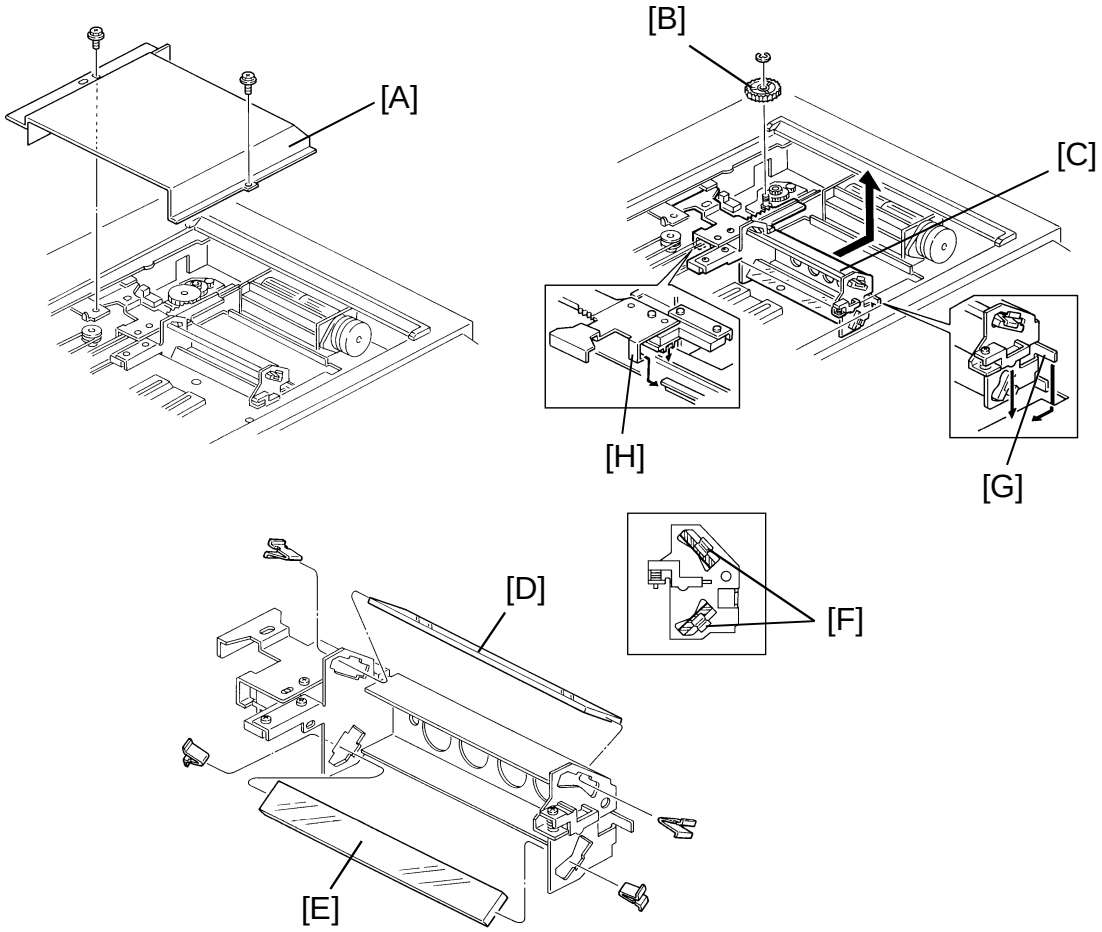
   b) Do not touch the reflecting surface with bare hands.

   c) When reinstalling the pulley bracket [G] while winding the exposure lamp harness [H] around the pulley [I], do not bend or break off the exposure lamp harness.

   d) Clean the optics components and perform the necessary SP modes (SP95, SP48, and SP56).

2.4 4TH AND 5TH MIRROR REPLACEMENT

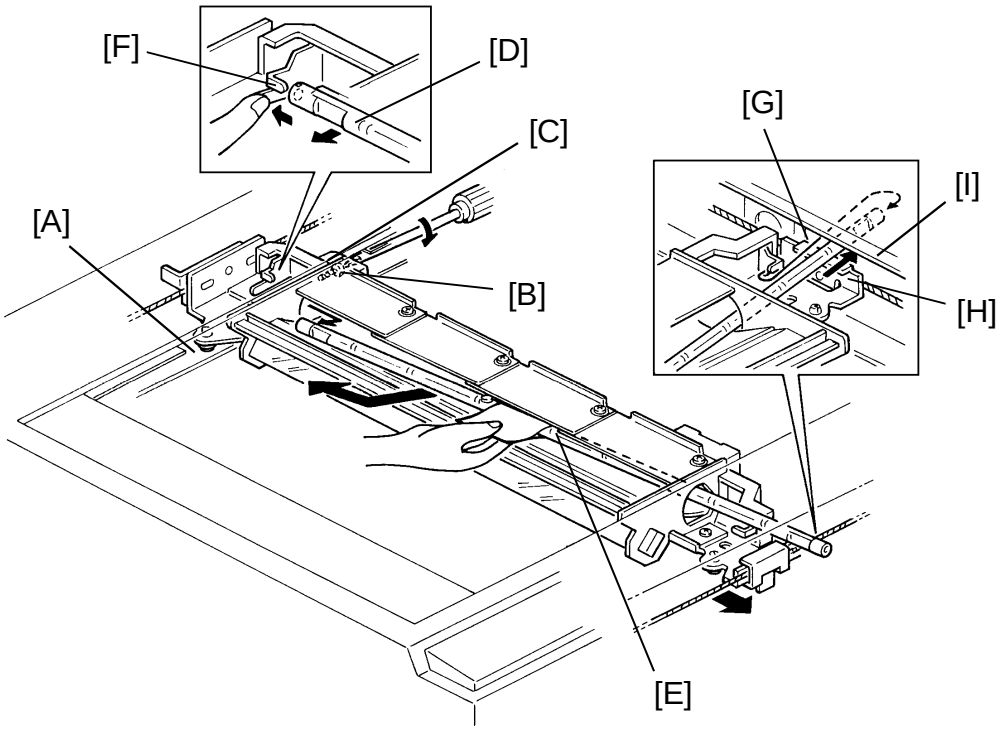
Rev. 1/95



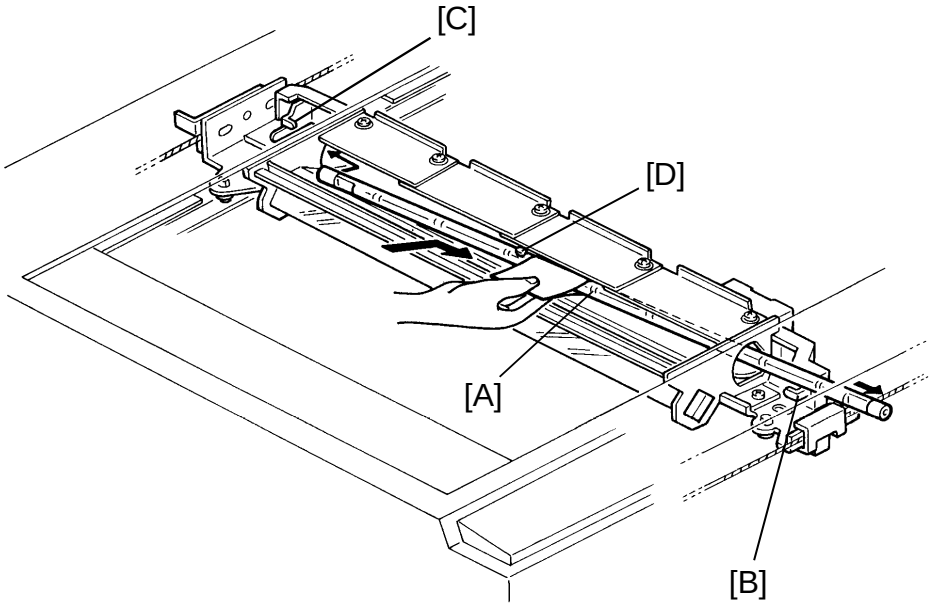
1. Turn off the main switch.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the lens cover [A] (2 screws).
4. Remove the 4th and 5th mirror assembly drive gear [B] (1 E-ring).
5. Slide the mirror assembly [C] all the way to the right and remove it.
6. Replace the fourth [D] and fifth [E] mirrors. (The procedure for removing the mirrors from their brackets is the same as for the second and third mirrors.)

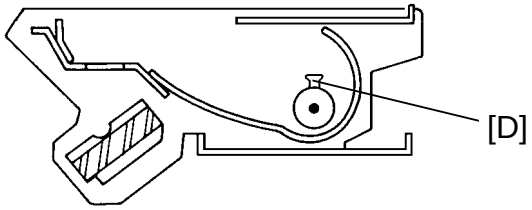
   NOTE: a) Make sure that the reflecting surface faces the lens.
   b) Position the spring plates [F] as shown.
   c) When reinstalling the 4th and 5th mirror assembly, make sure that the hooks [G and H] are properly positioned as shown.
   d) Clean the optics components and perform the necessary SP modes (SP95, SP48, and SP56).

2.5 EXPOSURE LAMP REPLACEMENT



1. Turn off the main switch and unplug the copier.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Move the first scanner to the cutout position at the rear frame [A] and move the first scanner toward the front side as shown.
4. Place a strip of paper around the exposure lamp.
5. Loosen the screw [B] in the rear lamp terminal bracket [C].
6. Take the rear side [D] of the exposure lamp [E] off the rear lamp terminal [F] while pressing the rear terminal.
7. Slide the exposure lamp toward the front side and pass the front side of the exposure lamp through the space [G] between the front scanner clamp [H] and the front copier frame [I] while lifting the rear side of the exposure lamp.
8. Take out the exposure lamp.





8. Install a new lamp [A]. Use a strip of paper as shown to hold the lamp. Set the front terminal [B] first.

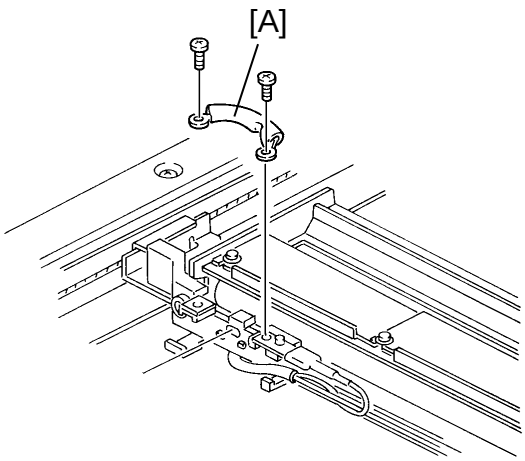
NOTE: a) Make sure that the exposure lamp is properly positioned at the front and rear [C] terminals.

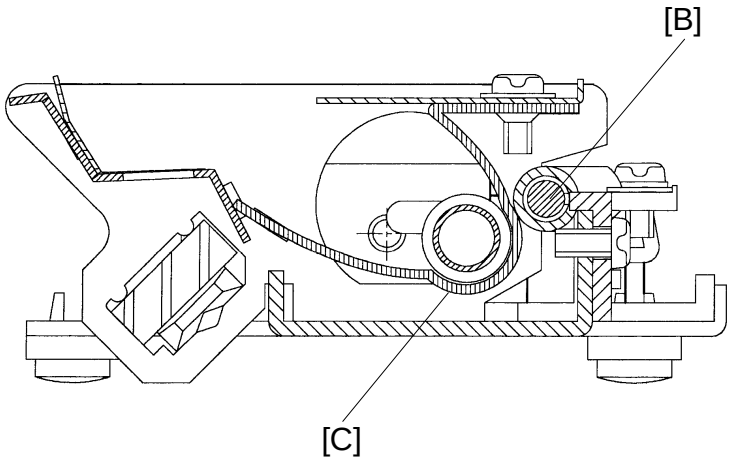
b) Make sure that the blister [D] on the lamp is pointing straight up as shown.

c) Return the first scanner to the original position and make sure that the first scanner moves smoothly.

d) Clean the optics components and perform the necessary SP modes (SP95, 48, and 56).

2.6 THERMOFUSE REPLACEMENT



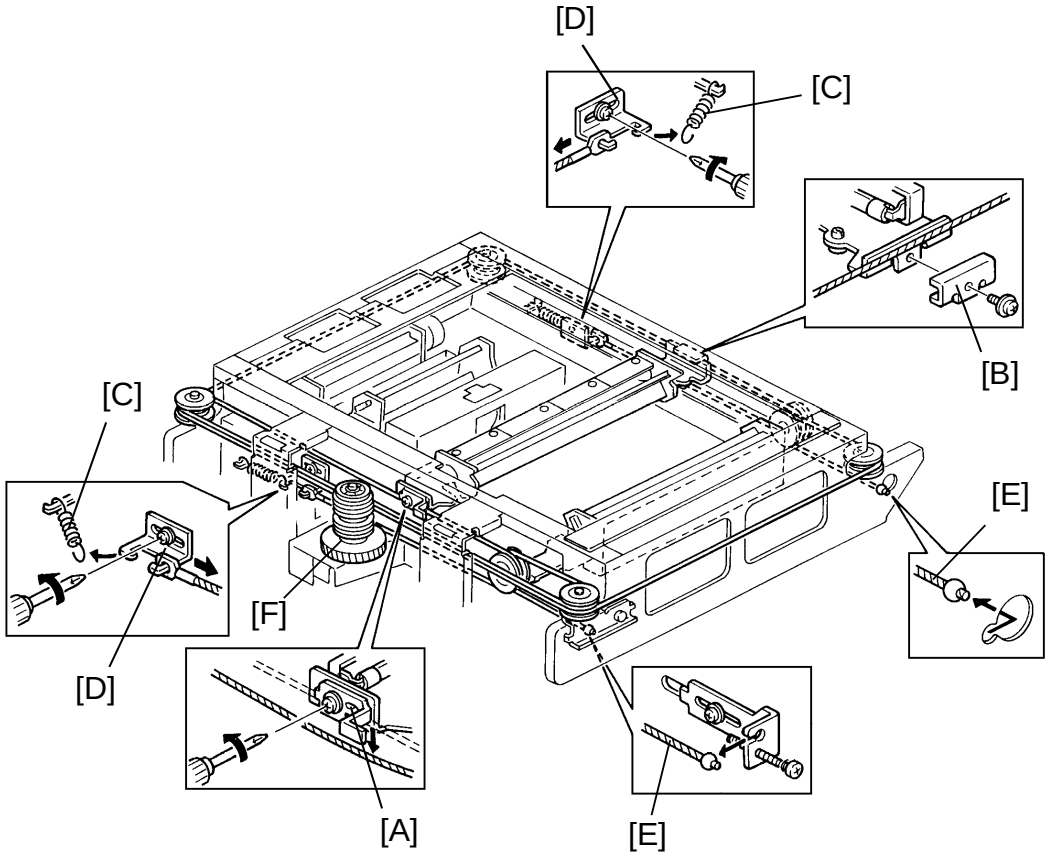


1. Turn off the main switch and unplug the copier.
2. Remove the exposure glass. (See Exposure Glass Removal.)
3. Replace the thermofuse [A] (2 screws).

NOTE: When installing a new thermofuse, make sure that the thermofuse [B] is in contact with the reflector [C] as shown.

2.7 SCANNER DRIVE WIRE REPLACEMENT

2.7.1 Wire Removal

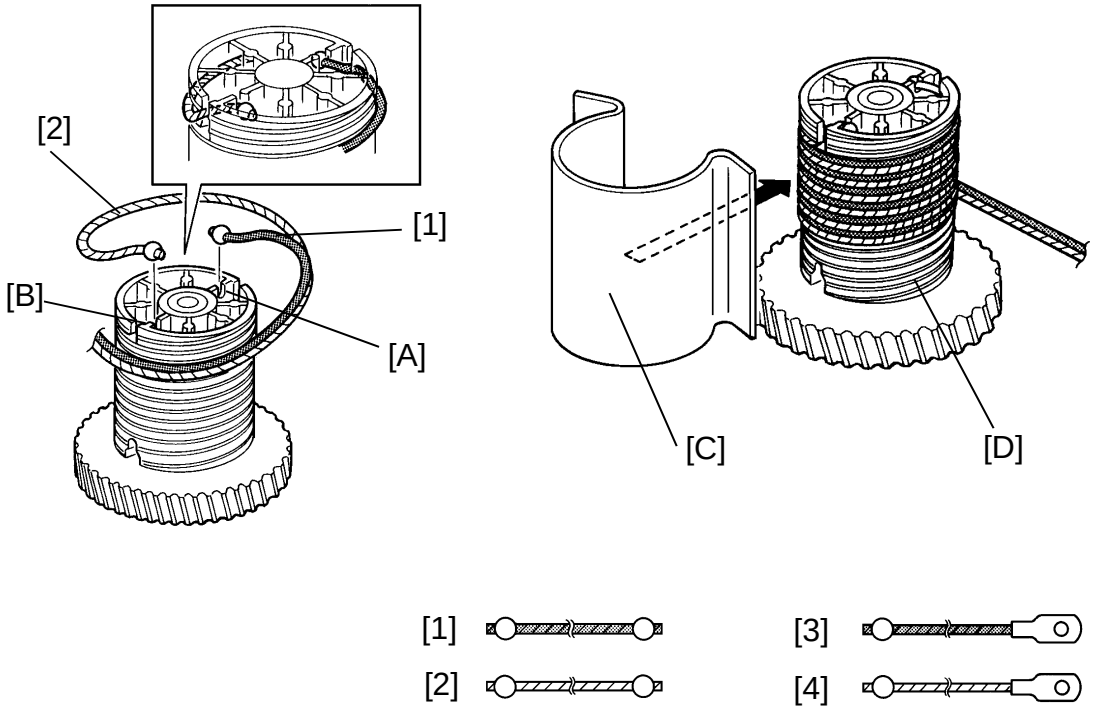


1. Remove the following covers and parts.

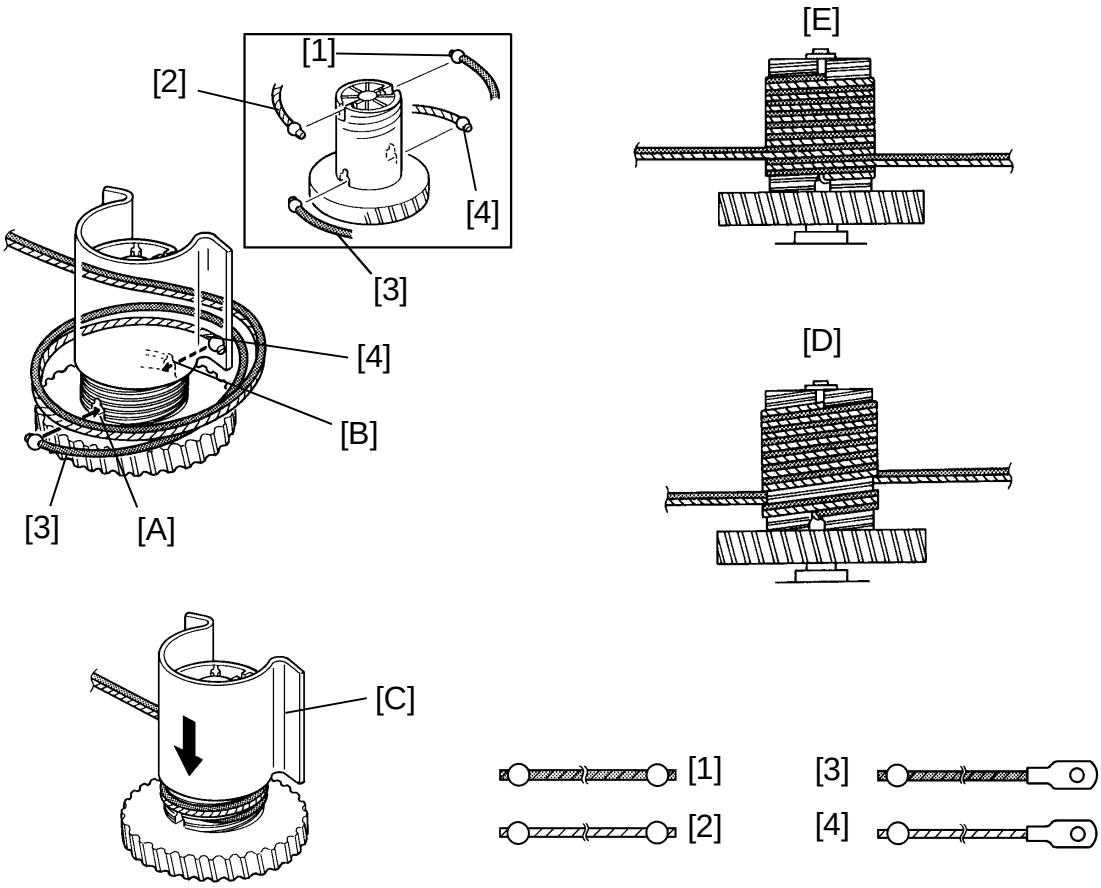
Platen cover (if installed)	Document feeder (if installed)
Upper rear cover	Upper cover
Exposure glass	Operation panel

2. Loosen the screw securing the rear first scanner wire clamp [A].
3. Remove the front first scanner wire clamp [B].
4. Remove the front and rear wire tightening springs [C].
5. Loosen the screws securing the front and rear wire fixing plates [D].
6. Remove the scanner wires [E] from the left side plate.
7. Remove the scanner wires (four wires) from the drive pulley [F].
8. Remove the drive pulley (1 E-ring).

2.7.2 Wire Installation



1. Put the bead at the end of the dark silver wire [1] in slot [A].
2. Put the bead of the light silver wire [2] in slot [B].
3. Wind the dark silver wire [1] clockwise half a turn around the pulley. Wind the light silver wire [2] clockwise one complete turn around the pulley.
4. Wind the dark and light silver wires together five and a half times around the pulley. Make sure that the dark silver wire is wound six times and the light silver wire is wound six and a half times in total.
5. Set the omega clamp [C] over the wires on the drive pulley [D] as shown.



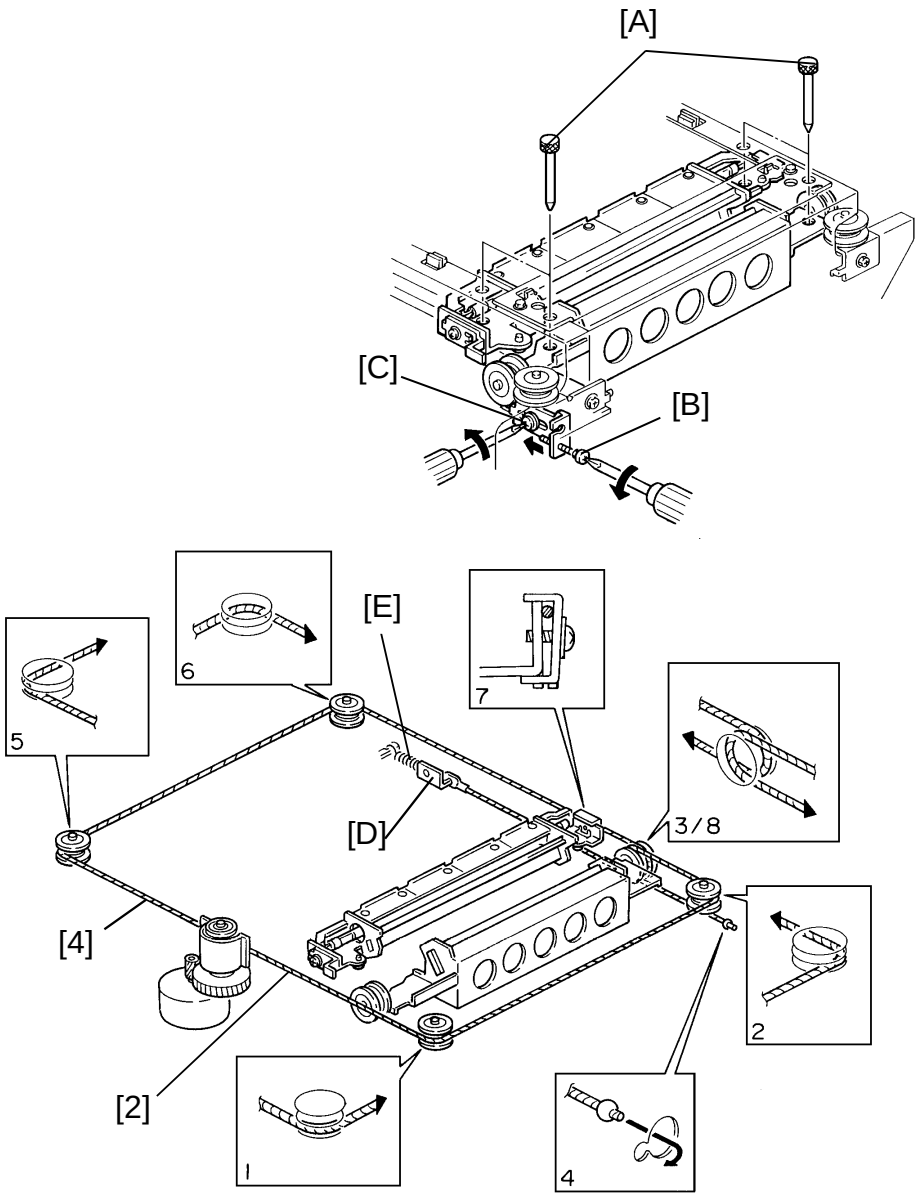
6. Put the bead of the dark silver wire [3] in slot [A], directly below the slot that holds the end of the light silver wire [2].
7. Put the bead of the light silver wire [4] in the other slot [B], directly below the slot that holds the end of the dark silver wire [1].
8. Wind the dark silver wire [3] clockwise one and a half times around the pulley. Wind the light silver wire [4] once clockwise around the pulley.
9. Slide the omega clamp [C] down to secure all the wires as shown.

   NOTE: a) The dark and light silver wires alternate on the pulley with the dark silver wire uppermost.

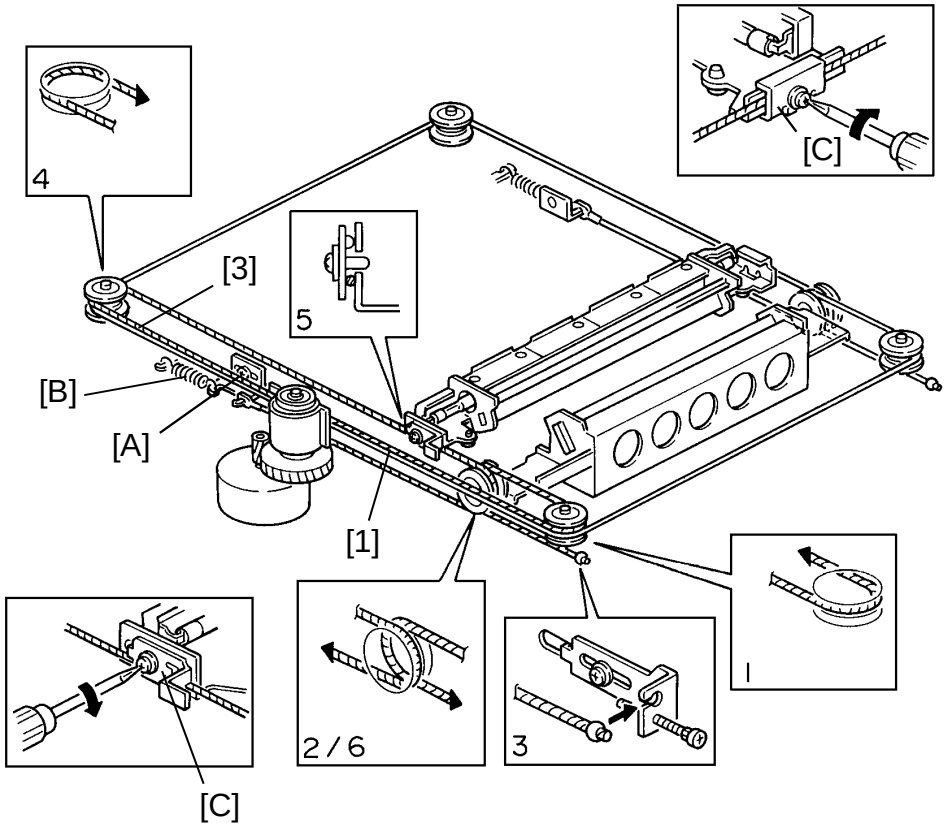
   b) Wires are not wound around the two grooves shown in the illustration (rear view [D]).

   c) Wires are wound around all the grooves shown in the illustration (front view [E]).

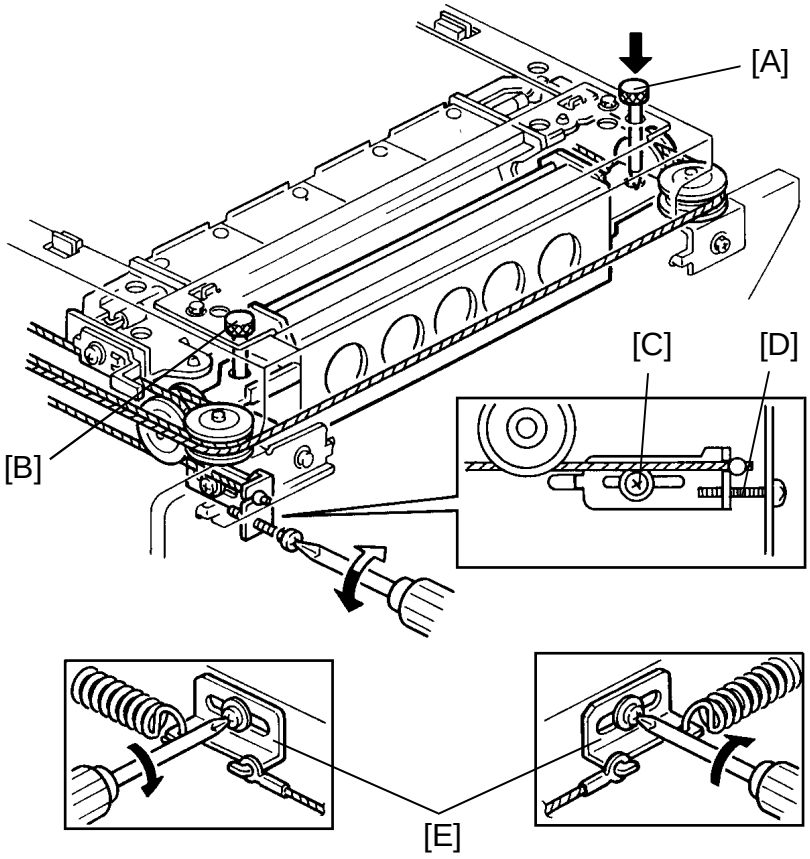
10. Set the pulley on the drive shaft (1 E-ring).



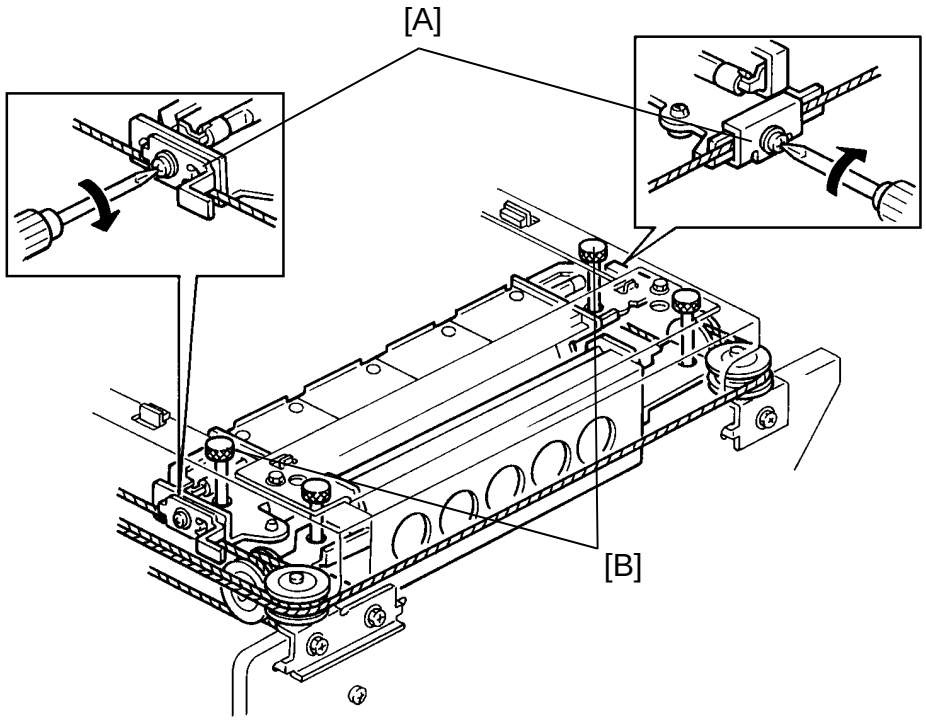
11. Manually move the first and second scanners to home position.
12. Insert the four positioning pins [A] in the holes on the scanner guide rails to secure the first and second scanners.
13. Loosen the wire tension bracket fixing screw [B] and the wire tension adjusting screw [C].
14. Loosen the screw securing the front fixing plate [D]. Place wires [2] and [4] on the pulleys as shown.
15. Hook the light silver wire [4] onto the front fixing plate and hook the wire tension spring [E] onto the front fixing plate and the frame projection.



16. Place the dark silver wires ([1] and [3]) around the pulleys as shown.
17. Attach wire [3] to the rear wire fixing plate [A], then hook one end of tension spring [B] to the fixing plate and the other end to the frame projection.
18. Reinstall and tighten the first scanner clamps [C] (front and rear) and remove the four positioning pins and the omega clamp.
19. Perform a free run (turn DIP switch 101-1 ON) to condition the wires.



20. Adjust the tension in the second scanner wire.
    (1) Insert positioning pin [A] in the hole at the front end of the second scanner.
    (2) Loosely insert positioning pin [B] in the hole at the rear end of the second scanner.
    (3) Loosen the two screws [C] and [D] securing the wire tension bracket, then turn the 2nd scanner positioning screw [D] clockwise until the rear positioning pin drops and locks in position.
    (4) Tighten the two screws [C] and [D] securing the wire tension bracket.
    (5) Make sure the positioning pin [B] slides in and out smoothly. If not, repeat step (3).
    (6) Tighten the screws securing the front and rear wire fixing plates [E].

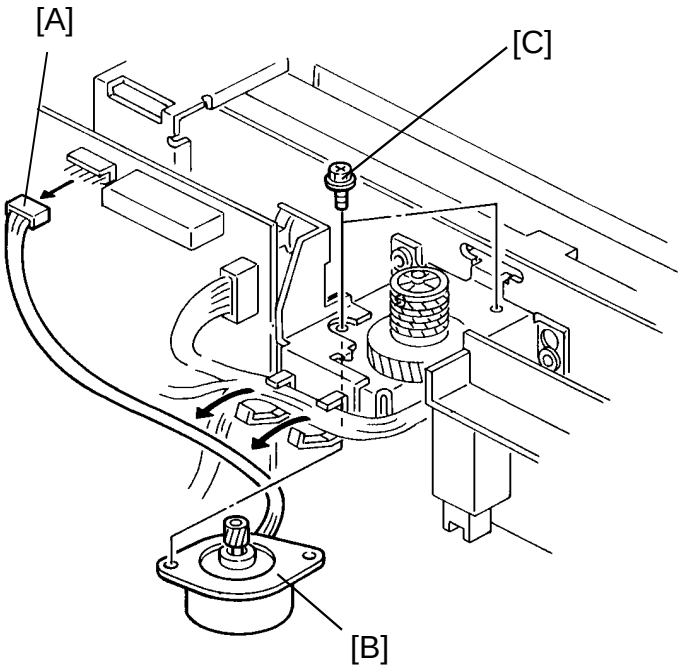


21. Adjust the first scanner wire clamps.
    (1) Loosen the front and rear first scanner wire clamps [A].
    (2) Insert the front and rear positioning pins [B] (2 pcs).
    (3) Tighten the wire clamps.

22. Reassemble.

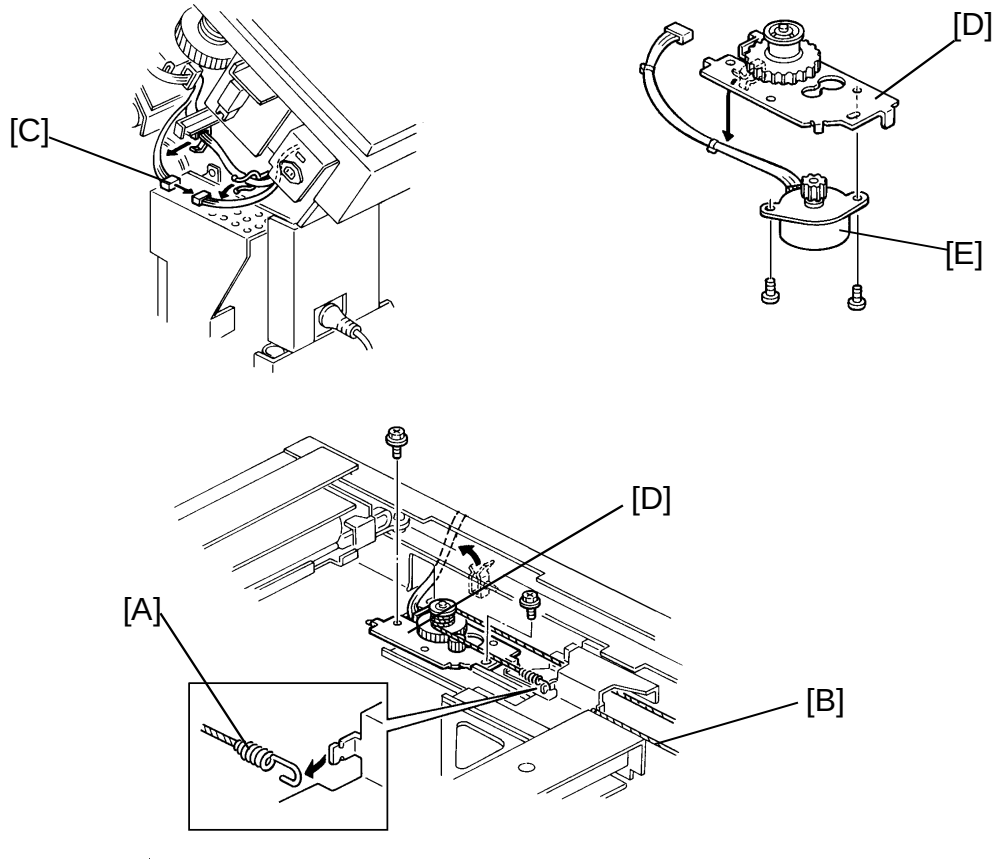
    NOTE: Always adjust the first scanner wire clamps after adjusting the tension in the second scanner wire.

2.8 SCANNER MOTOR REPLACEMENT

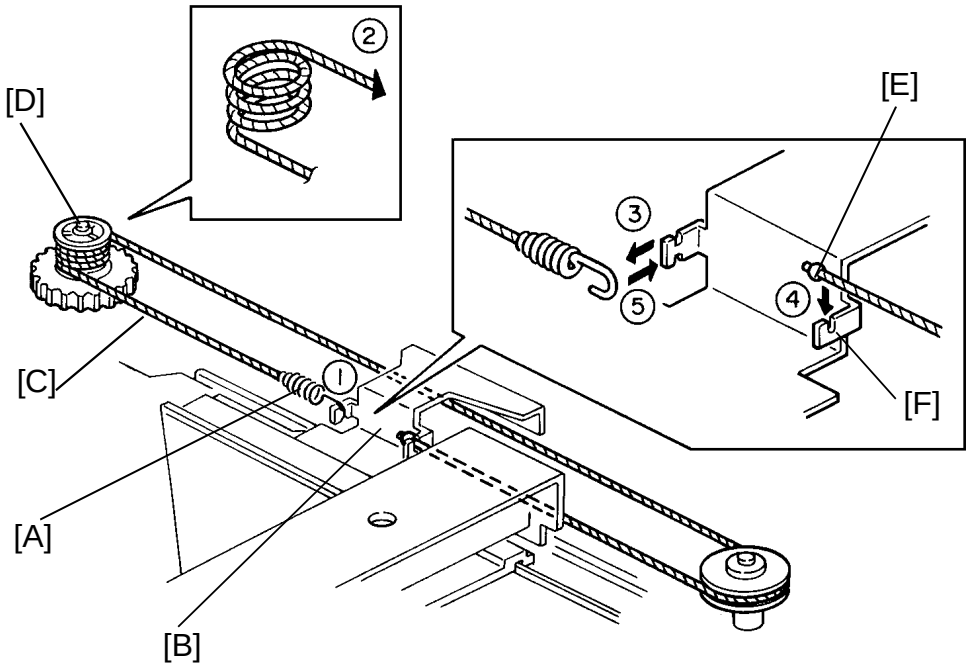


1. Turn off the main switch.
2. Remove the platen cover or DF.
3. Remove the upper rear cover and the upper cover.
4. Remove the 6P connector [A] from the main board (CN 105) and remove the scanner motor harness from the harness clamps.
5. Replace the scanner motor [B] (2 screws [C]).

2.9 LENS DRIVE MOTOR REPLACEMENT (FT3213 Copier only)



1. Turn off the main switch.
2. Remove the exposure glass and the lens cover.
3. Remove the tension spring [A] and the lens drive wire [B].
4. Remove the upper rear cover (2 screws).
5. Open the front cover.
6. Open the upper unit by pushing the release lever.
7. Disconnect the lens motor 6P connector [C].
8. Close the upper unit.
9. Remove the lens motor bracket [D] (2 screws and 1 clamp).
10. Remove the motor [E] from the bracket (2 screws), and replace the motor.
11. Reassemble.

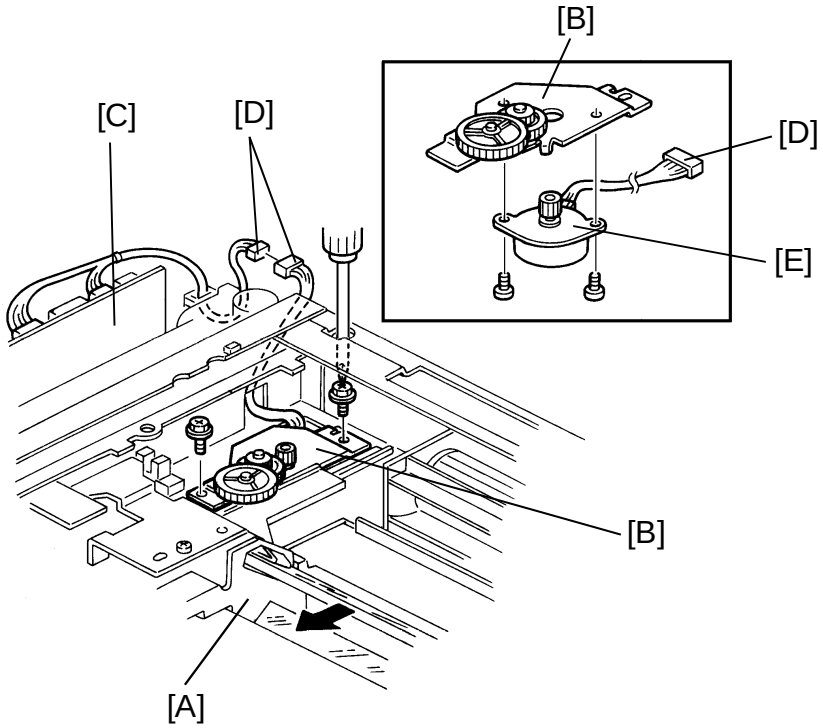


– Lens Drive Wire Installation –

1. Hook the spring [A] onto the sensor actuator bracket [B].
2. Wind the lens drive wire [C] three and half times around the pulley [D].
3. Unhook the spring and place the bead [E] at the other end of the wire in slot [F] on the sensor actuator bracket.
4. Reattach the spring to the bracket.

   NOTE: Rotate the lens drive pulley and make sure that the lens drive wire moves smoothly.

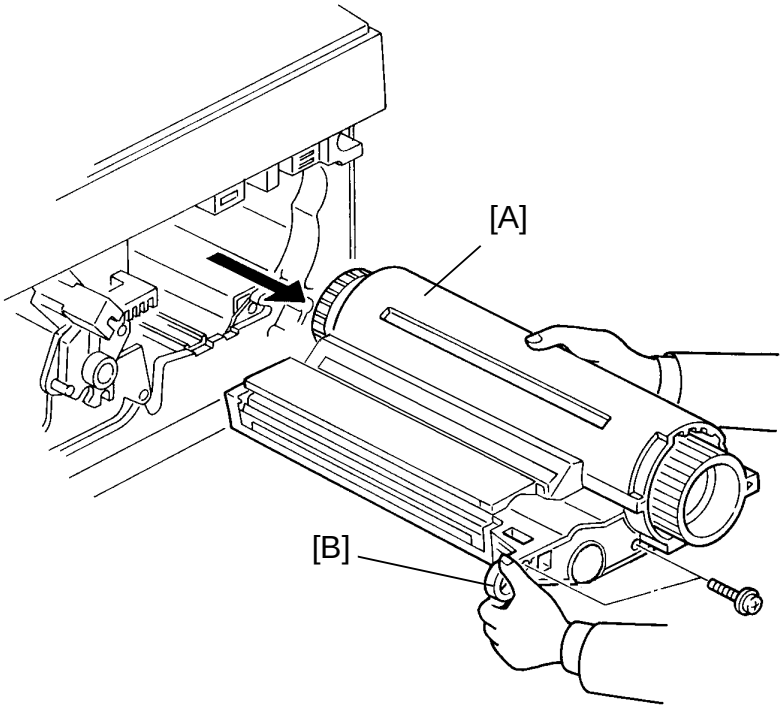
2.10 4TH/5TH MIRROR MOTOR REPLACEMENT (FT3213 Copier Only)



1. Turn off the main switch.
2. Remove the following parts.
   - Platen cover or DF
   - Exposure glass
   - Upper rear cover
   - Lens cover
   - Upper cover
   - Right cover
3. Move the 4th/5th mirror assembly [A] to the left (viewed from the front).
4. Remove the motor bracket [B] (2 screws)
5. Free the copier main board [C] (3 locking supports).
6. Disconnect the motor 6P connector [D] located between the main board and the copier frame.
7. Separate the 4th/5th mirror motor [E] from the bracket (2 screws) and replace it.

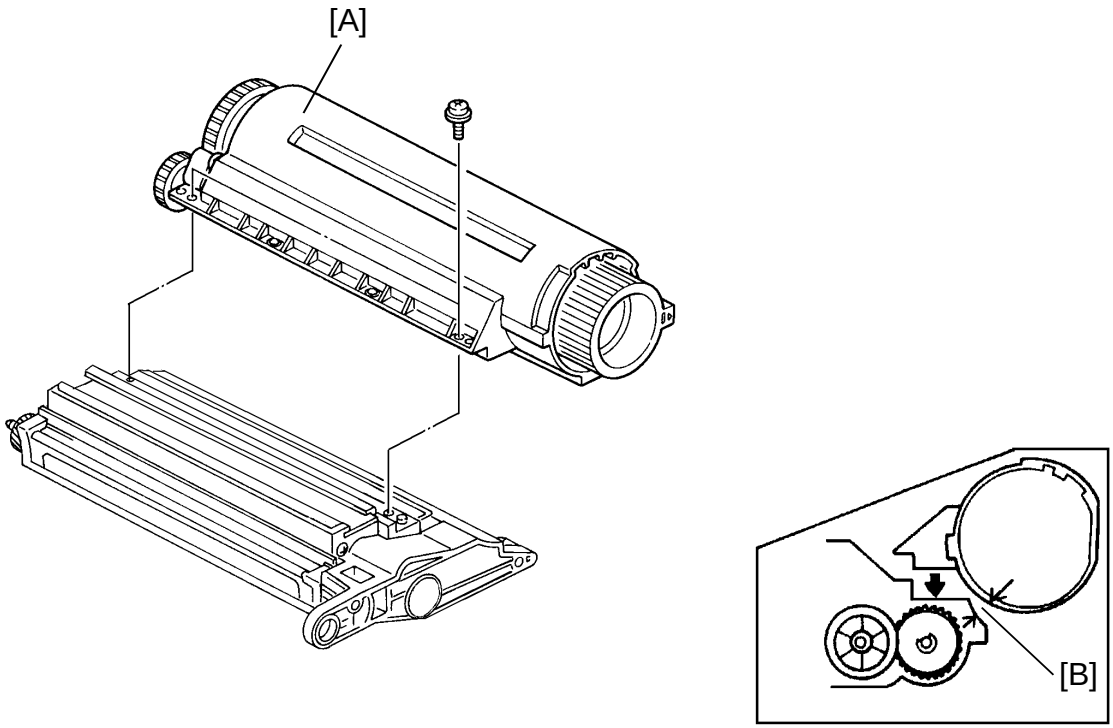
3. DEVELOPMENT AND TONER SUPPLY

3.1 DEVELOPMENT UNIT REMOVAL



1. Open the front cover.
2. Remove the two screws as shown in the illustration above and take out the development unit [A] while pulling the left side of the development cover [B].

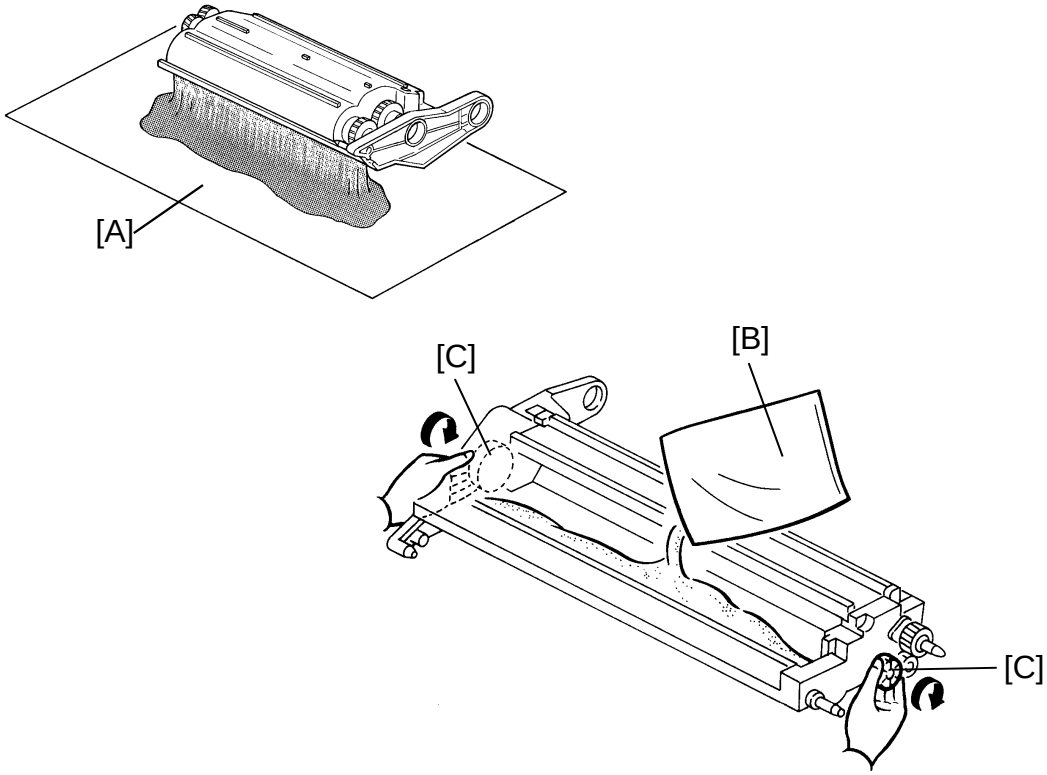
3.2 TONER SUPPLY UNIT REMOVAL



1. Take out the development unit. (See Development Unit Removal.)
2. Remove the toner supply unit [A] (2 screws).

   NOTE: When reinstalling, make sure that there is no gap [B] between the toner supply unit and the development unit. (See the Illustration.)

3.3 DEVELOPER REPLACEMENT

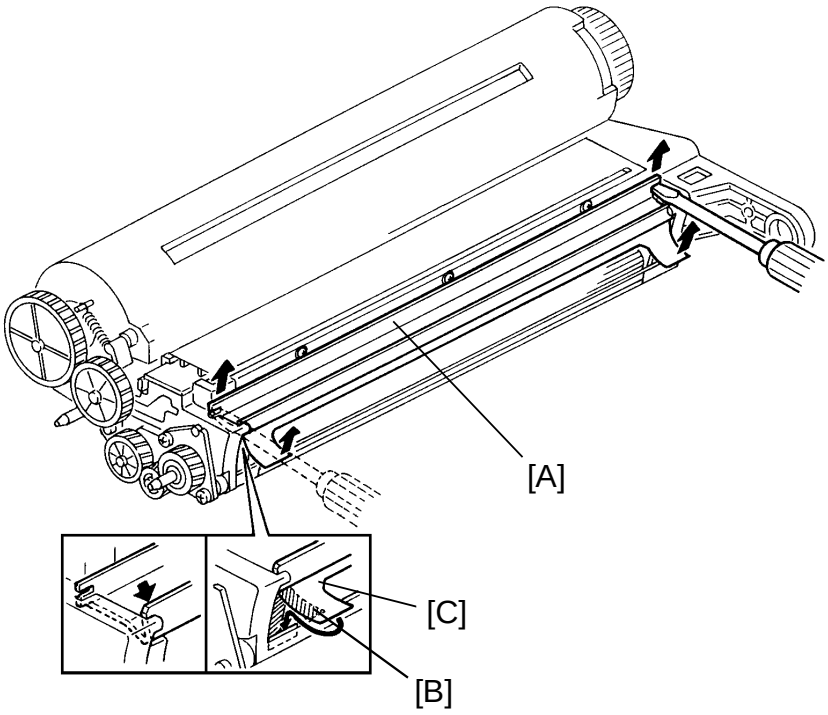


1. Remove the development unit (2 screws).
2. Set the development unit on a large sheet of paper [A].
3. Remove the toner supply unit (2 screws). (See Toner Supply Unit Removal.)
4. Empty all the developer onto the paper making sure that no developer remains on the development roller or in the unit.

   NOTE: Dispose of the used developer according to local regulations.
5. Take one pack of developer [B], shake it well, and pour it into the development unit while rotating the gears [C] on both sides to distribute the developer evenly as shown.

   NOTE: When installing new developer or manually rotating the development roller, always make sure to turn the gears in the direction shown in the above diagram. The copier might be damaged if they are turned in the opposite direction.
6. Reinstall the toner supply unit and set the development unit in the machine.
7. Perform the initial setting for new developer using SP65.

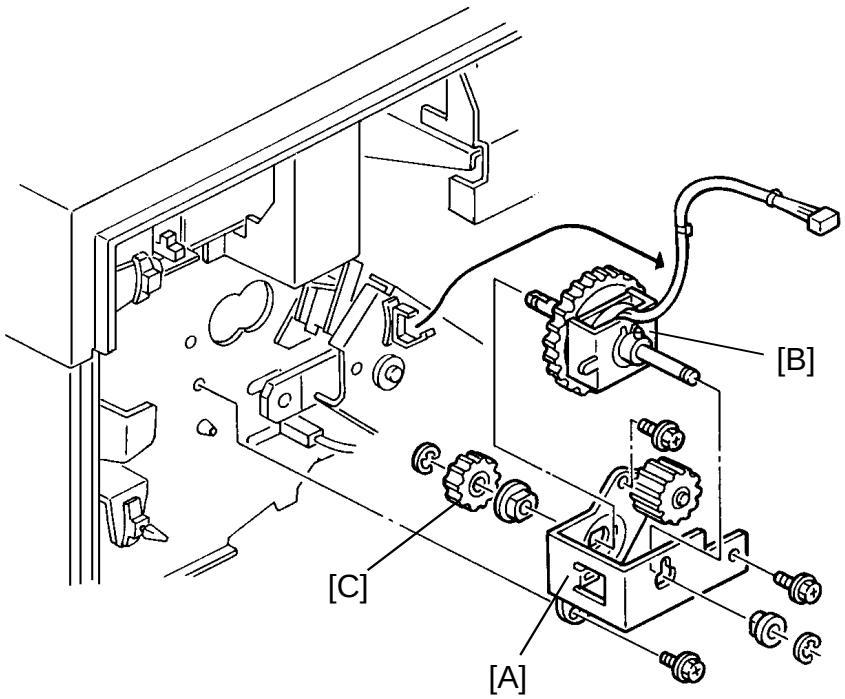
3.4 INLET SEAL REMOVAL



1. Take out the development unit.
2. Remove the inlet seal plate [A] by working a small slotted screwdriver as shown.

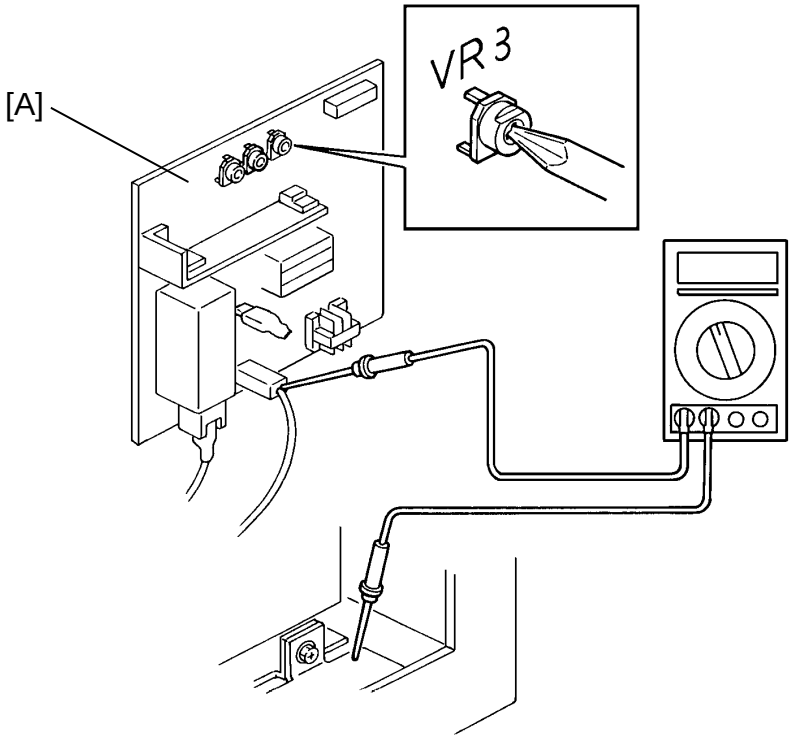
   NOTE: To install a new inlet seal plate, remove the covering from the double-sided tape [B] and affix the inlet seal [C] to the development unit lower casing. Tuck both ends of the seal inside the lower casing as shown.

3.5 TONER SUPPLY CLUTCH REPLACEMENT



1. Turn off the main switch.
2. Remove the upper rear cover and main board (all connectors and 3 locking supports).
3. Remove the toner supply clutch bracket [A] (3 screws).
4. Remove the clutch [B] from the clutch bracket (2 E-rings, 2 bushing, and 1 gear [C]).

3.6 DEVELOPMENT BIAS VOLTAGE ADJUSTMENT (SP9-38)



ADJUSTMENT STANDARD	Adjusting VR	SP mode
DC –500 ± 10 V	VR3	SP9-38

NOTE: VR3 on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRB when the CC/Grid/Bias power pack is replaced.

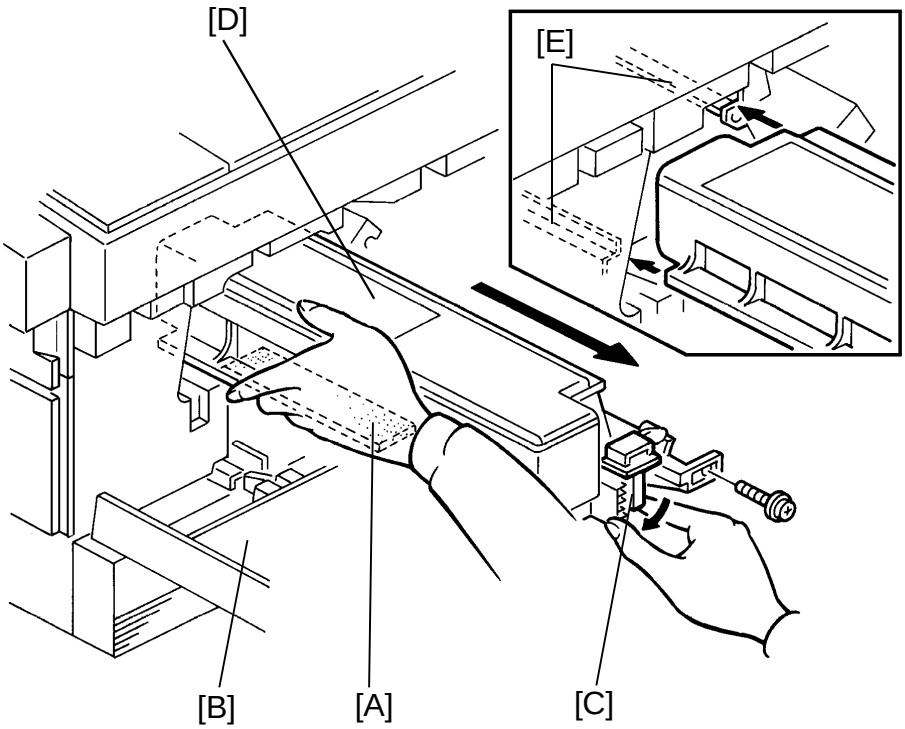
1. Set the multimeter range to dc 1500 V and connect the multimeter leads as shown.

   NOTE: Keep the multimeter leads away from the main board.

2. Turn on the main switch, close the front cover safety switch, then turn on the development bias using SP9-38.
3. Adjust the development bias voltage to –500 ± 10 V by turning VR3 on the CC/Grid/Bias power pack [A].
4. Press the Clear/Stop key and turn off the main switch.

4. CLEANING

4.1 CLEANING UNIT REMOVAL

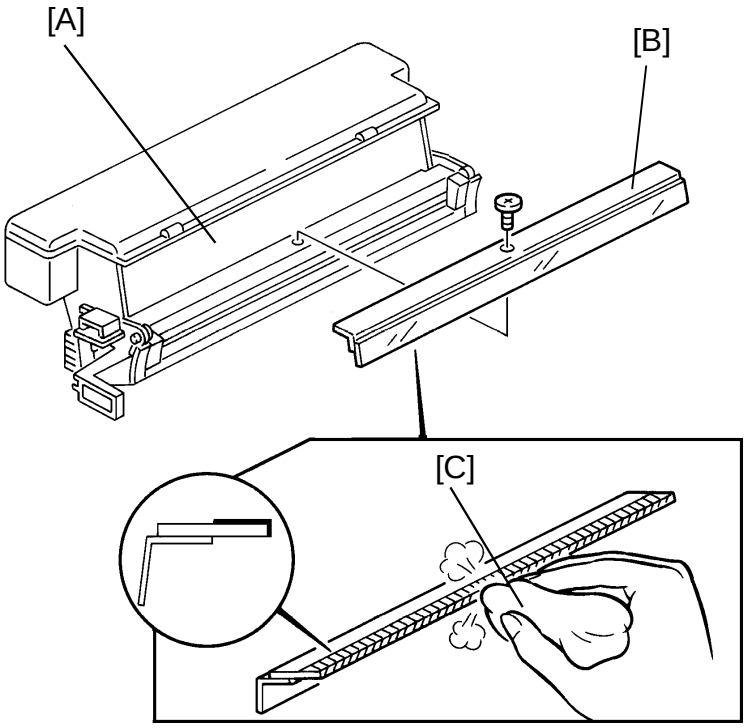


NOTE: The bottom plate of the cleaning unit may be hot from the heat of the fusing unit. Remove the unit by supporting your left hand on the cushion [A] attached under the bottom plate as shown.

1. Open the front cover [B].
2. While holding down the cleaning blade release lever [C], remove the cleaning unit [D] (1 screw) as shown.

NOTE: When reinstalling, make sure that the unit slides properly on the two guide rails [E].

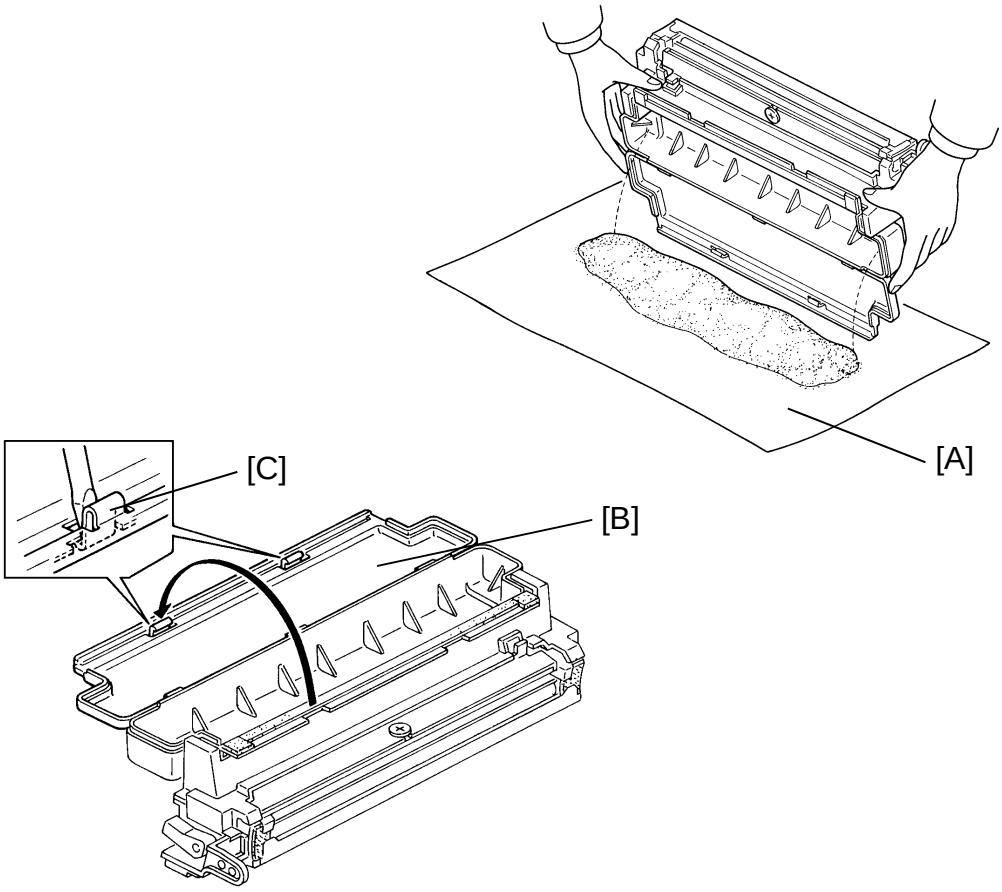
4.2 CLEANING BLADE REPLACEMENT



1. Remove the cleaning unit [A]. (See Cleaning Unit Removal.)
2. Remove the cleaning blade [B] (1 shoulder screw).

NOTE: a) Do not touch the edge of a new cleaning blade, as it is damaged easily.
b) Apply setting powder [C] evenly on the surface and edge of the new cleaning blade.
c) After installing a new cleaning blade, make sure it swivels.

4.3 USED TONER COLLECTION



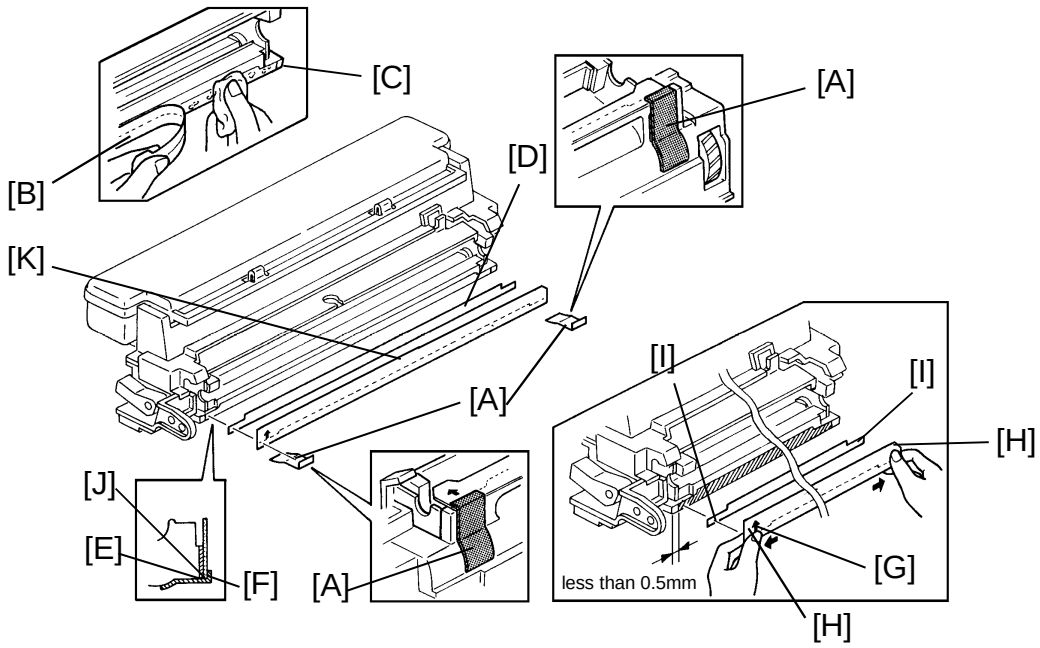
CAUTION: After disposing of the toner in the used toner tank, SP83 must be done to clear the memory counter (SP58).

1. Remove the cleaning unit. (See Cleaning Unit Removal.)
2. Set the cleaning unit on a large sheet of paper [A].
3. Open the toner collection cover [B] while removing the hooks [C].

   NOTE: Do not peel off the tape on the toner collection cover.
4. Pour the used toner slowly onto the paper sheet so that the toner does not scatter.
5. Place the paper sheet with the used toner into a plastic bag.

   NOTE: Dispose according to local regulations.
6. Reinstall the cleaning unit.
7. Perform SP83 to clear the memory counter.

4.4 ENTRANCE SEAL REPLACEMENT



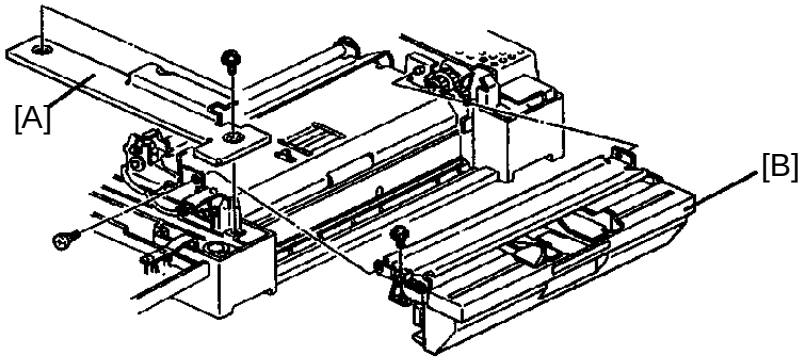
1. Remove the cleaning unit. (See Cleaning Unit Removal.)
2. Remove the used toner. (See Used Toner Collection.)
3. Clean the cleaning unit a vacuum cleaner.
4. Remove the two seals [A] and the entrance seal [B] together with the strip of double-sided tape securing it to the lower casing [C].
5. Clean the lower casing with alcohol; make sure that no tape remains on the casing surface.
6. Place a new strip of double-sided tape [D] on the lower casing surface. The lower edge [E] of the tape must be flush with the edge [F] of the projection as shown in the illustration.
7. Place the new entrance seal on the double-sided tape (the blue arrow [G] should point up and be placed on the left side as shown). Extend the seal so that both edges [H] align with the left and right edges [I] of the tape.

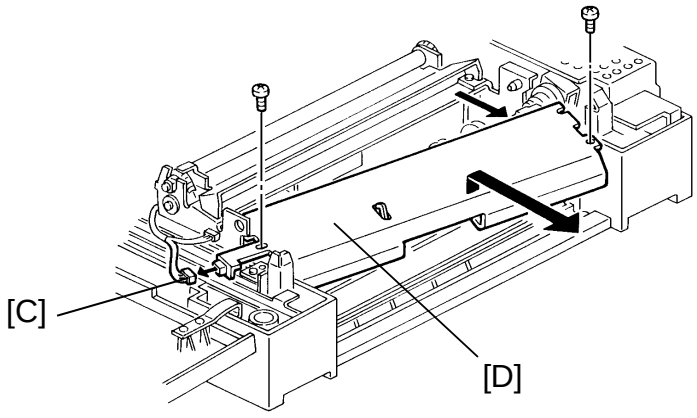
   NOTE: a) The lower edge [J] of the entrance seal must be aligned with the edge [F] of the projection on the lower casing.

   b) Make sure that there are no kinks in the upper edge [K] of the entrance seal.
8. Place the two seals [A] on both sides of the entrance seal as shown.

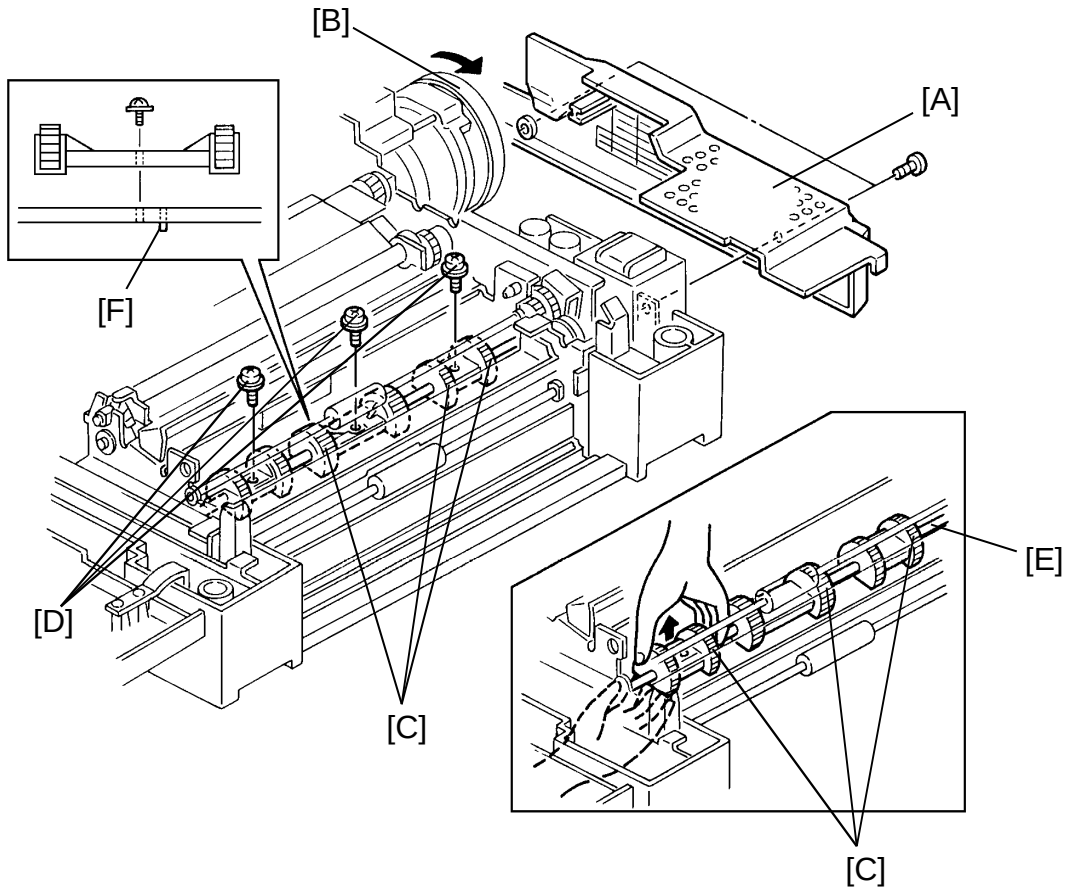
5. PAPER FEED

5.1 FEED ROLLER REPLACEMENT





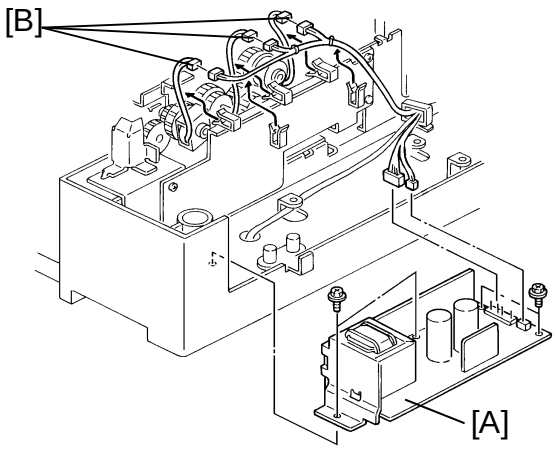
1. Turn off the main switch.
2. Remove the 1st paper tray.
3. Remove the front cover.
4. Open the upper unit by pushing the release lever.
5. Remove the manual feed table [B] (1 screw and 1 shoulder screw).
6. Remove the harness cover [A] (2 screws).
7. Remove the relay sensor connector [C].
8. Remove the relay roller guide plate [D] as shown (2 screws).

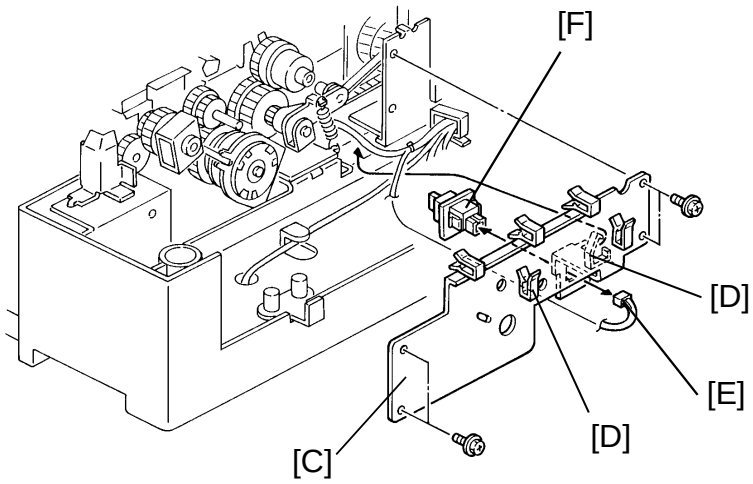


9. Remove the lower rear cover [A] (2 screws).
10. While turning the main motor [B] clockwise (viewed from the front), turn the feed rollers [C] until you can remove the feed roller screws [D].
11. Remove three feed roller screws (1 screw each).
12. Remove the feed rollers from the shaft [E] while pushing them up with your hands as shown.

NOTE: When reinstalling the feed rollers, make sure that they are positioned on the opposite side of the spring pin [F] as shown. Otherwise, the six feed rollers will be positioned incorrectly.

5.2 PAPER TRAY SWITCH REPLACEMENT

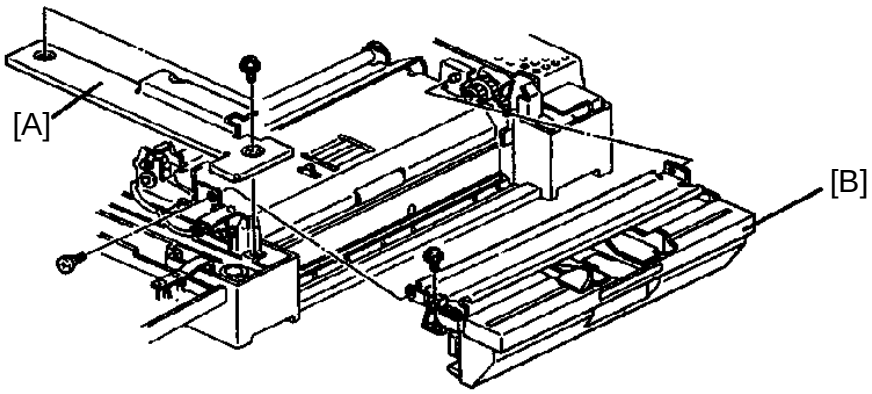


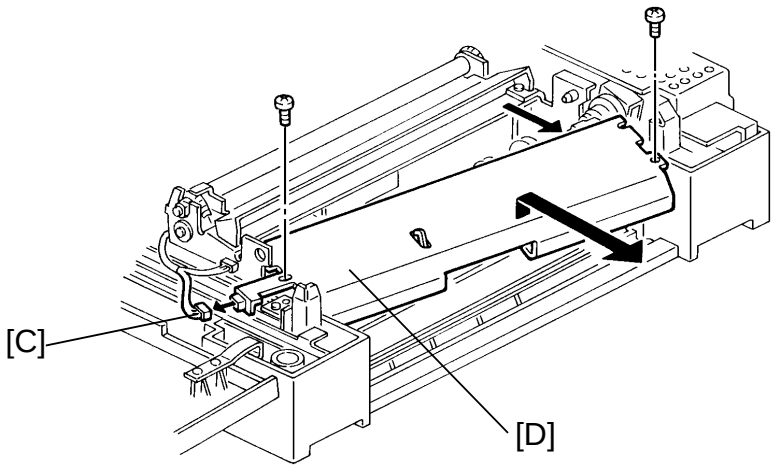


1. Turn off the main switch.
2. Remove the paper tray.
3. Open the front cover.
4. Open the upper unit by pushing the release lever.
5. Remove the lower rear cover (2 screws).
6. Remove the DC power supply unit [A] (4 screws and all connectors).
7. Remove three clutch connectors [B].
8. Remove the rear side plate [C] (4 screws, 1 clamp [D] and 1 connector [E]).
9. Remove the paper tray switch [F] from the rear side plate.

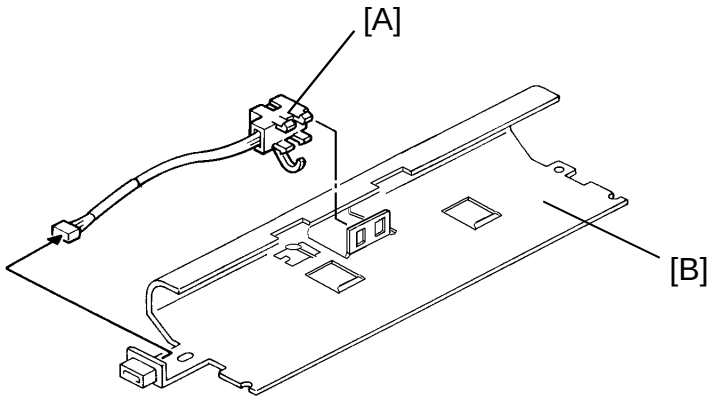
5.3 RELAY SENSOR AND REGISTRATION SENSOR REPLACEMENT

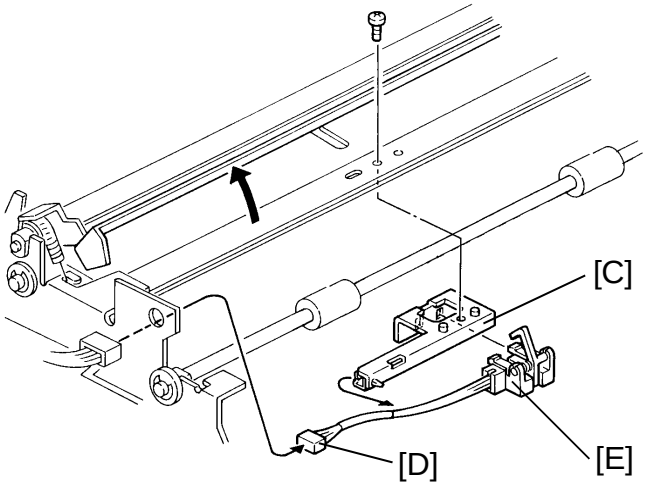
Rev. 4/97





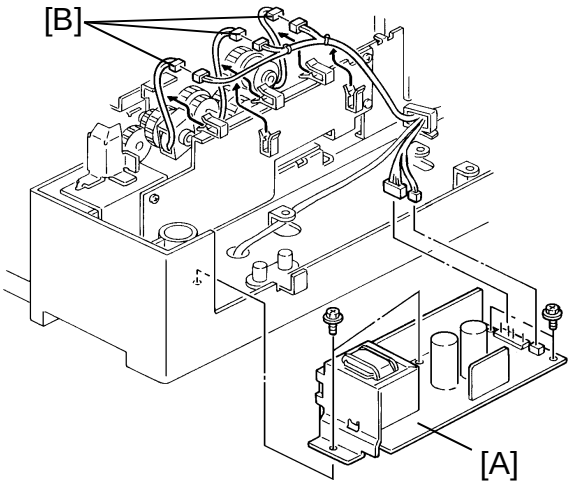
1. Turn off the main switch.
2. Open the front cover.
3. Open the upper unit by pushing the release lever.
4. Remove the harness cover [A] (2 screws).
5. Remove the by-pass feed table [B] (1 screw and 1 shoulder screw).
6. Remove the relay sensor connector [C].
7. Remove the relay roller guide plate [D] as shown (2 screws).

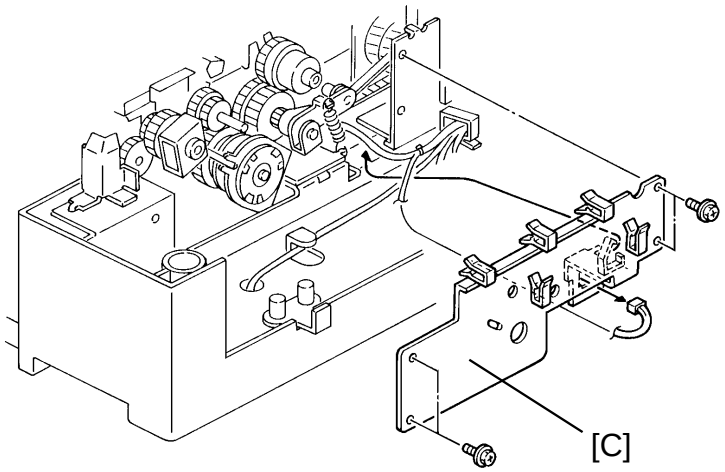




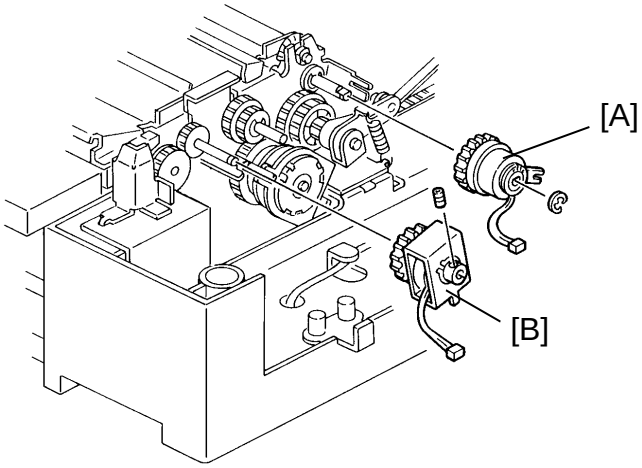
8. Remove the relay sensor [A] from the guide plate [B] as shown.
9. Remove the registration sensor bracket [C] (1 screw and 1 connector [D]).
10. Remove the registration sensor [E] from the bracket as shown.

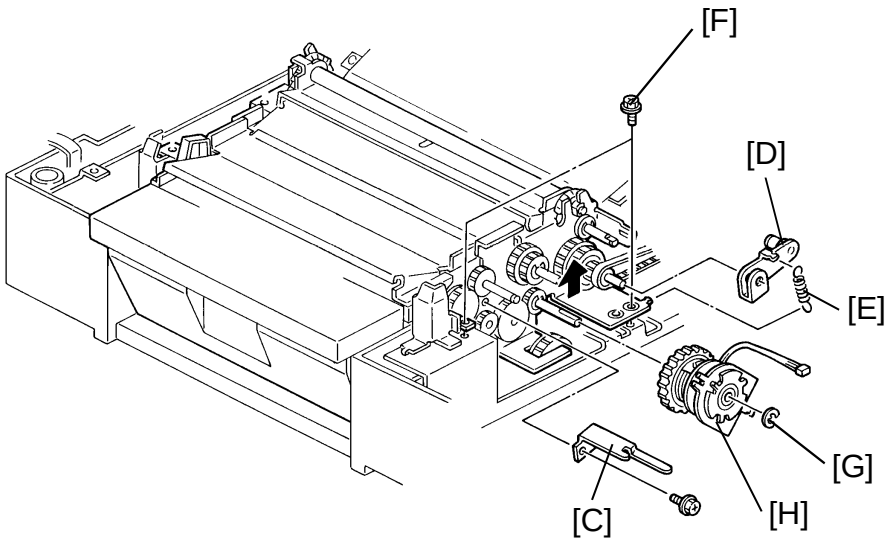
5.4 RELAY ROLLER CLUTCH, PAPER FEED CLUTCH AND REGISTRATION CLUTCH REPLACEMENT





1. Turn off the main switch.
2. Open the front cover.
3. Open the upper unit by pushing the release lever.
4. Remove the lower rear cover (2 screws).
5. Remove the DC power supply unit [A] (4 screws and all connectors).
6. Remove three clutch connectors [B].
7. Remove the rear side plate [C] (4 screws, 1 clamp and 1 connector).



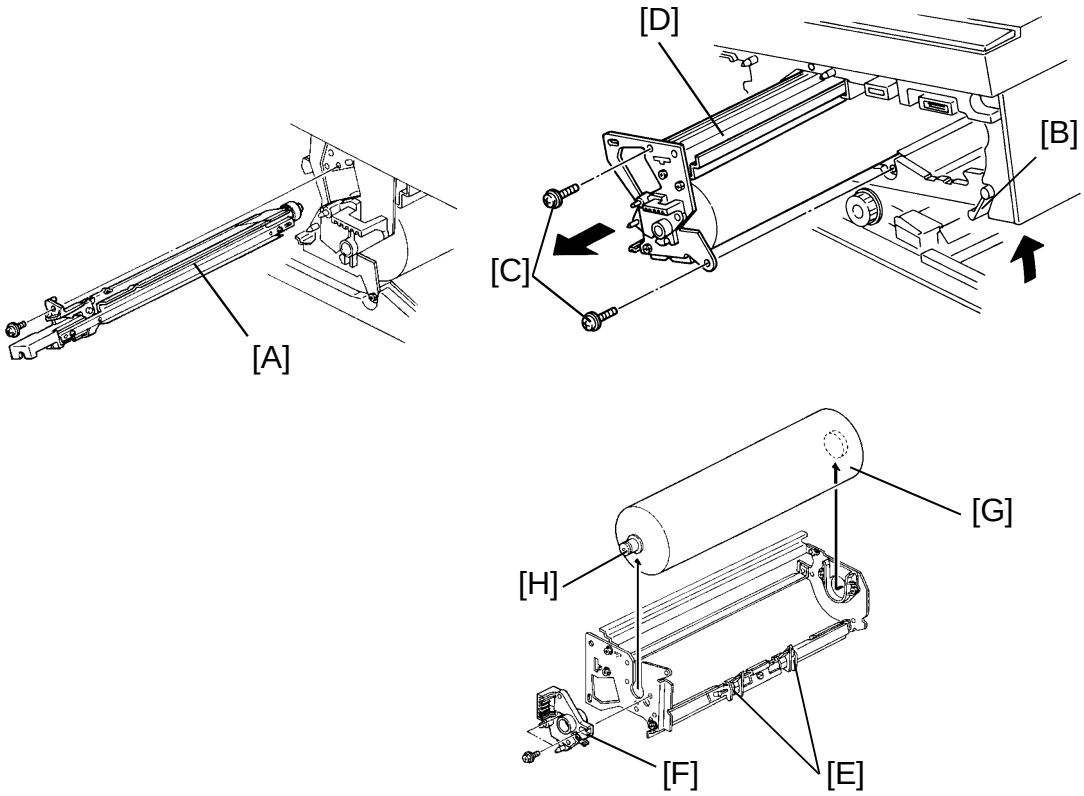


8. Remove the registration clutch [A] (1 E-ring).
9. Remove the relay roller clutch [B] (1 allen screw).
10. Remove the clutch stopper [C] (1 screw).
11. Remove the timing belt tightener [D] (1 spring [E]).
12. Remove two screws [F] securing the 1st paper feed unit.
13. Remove the E-ring [G] securing the paper feed clutch [H].
14. Remove the paper feed clutch while slightly lifting the 1st paper feed unit.

NOTE: When reinstalling the clutches, make sure that the clutch stoppers lock the clutches.

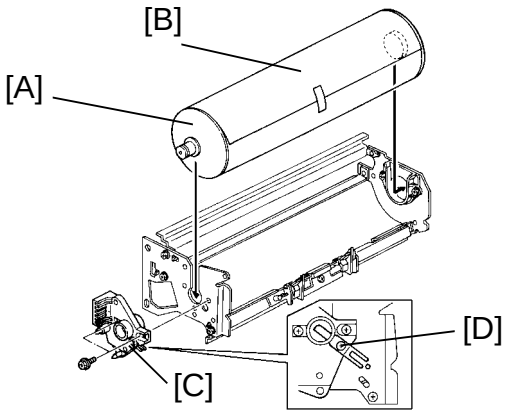
6. AROUND THE DRUM

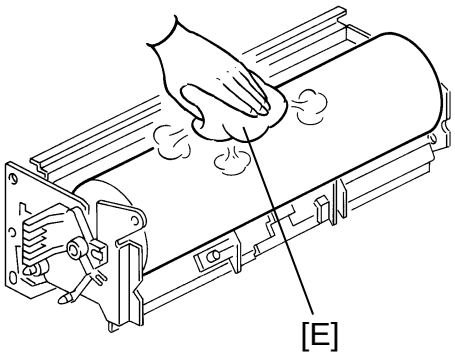
6.1 DRUM REPLACEMENT



1. Open the front cover
2. Remove the following units:
   - Development unit (See Development Unit Removal.)
   - Cleaning unit (See Cleaning Unit Removal.)
   - Charge corona unit [A] and wire cleaner (1 screw)
3. Remove the inner cover (5 screws).
4. Hold down the top of the upper unit and open the upper unit by pushing the release lever [B].
5. Remove the two screws (gold) [C] securing the drum stay and pull out the drum unit [D] gently along the rail.
6. Place the drum unit on a sheet of paper so that the leading edge of the pick-off pawls [E] are pointing upward as shown.
7. Remove the front drum holder [F] (2 screws).
8. Remove the drum [G] by holding the drum unit rail and pulling out and up on the drum knob [H].

   NOTE: When removing the drum, take care not to strike it against any objects.





9. Set the new OPC drum [A] in the unit without removing the protective sheet [B].

   NOTE: When setting the drum in the unit, be careful not to strike it against the rail.

10. Reinstall the front drum holder [C] (2 screws).

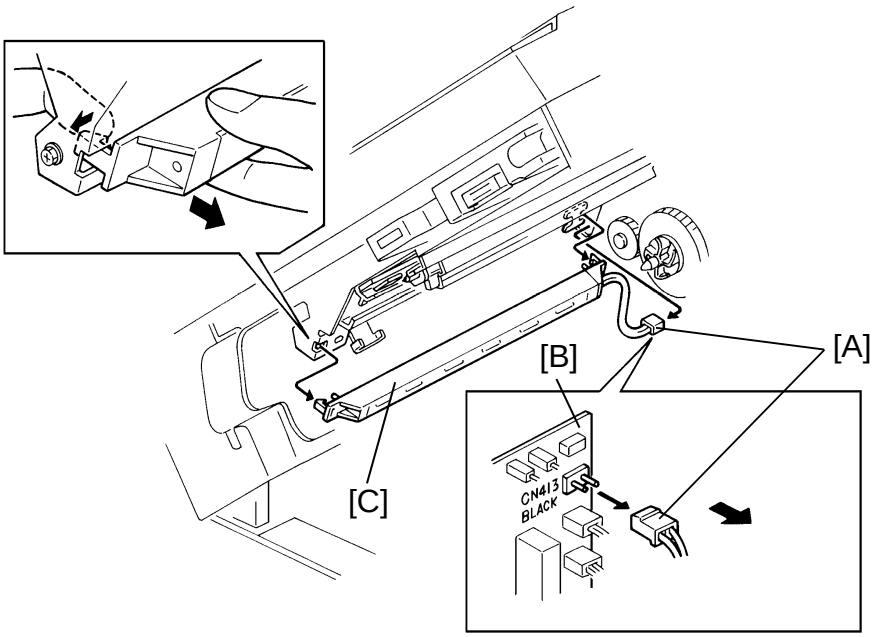
    NOTE: Do not bend the grounding plate [D]. Make sure that the grounding plate is in contact with the drum unit frame to ground the drum. If it is not in contact, solid black copies may occur.

11. Remove the protective sheet [B] and apply setting powder [E] evenly on the drum surface.
12. Set the drum unit in the machine.
13. Reinstall the other units around the drum unit.
14. Reset the drum counter using SP66.

    NOTE: The drum counter must be reset with SP66 whenever an OPC drum is replaced.

15. Perform the ID sensor (Vsg) adjustment using SP54. (See ID Sensor Adjustment.)
16. Check the copy quality and perform the necessary SP modes.

6.2 QUENCHING LAMP REPLACEMENT

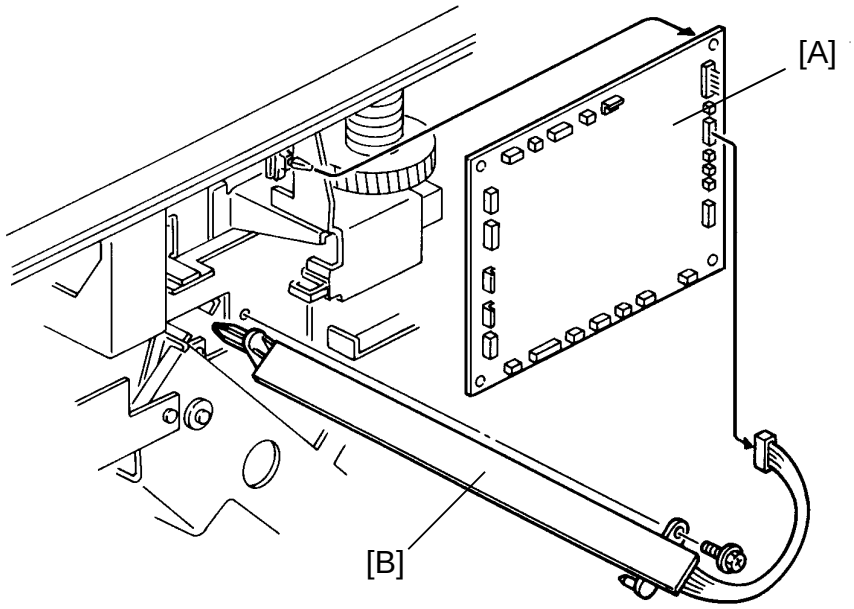


1. Open the front cover.
2. Remove the following parts:
   - Inner cover
   - Development unit
   - Cleaning unit
   - Charge corona unit
   - Upper rear cover
3. Hold down the top of the upper unit and open the upper unit by pushing the release lever.
4. Remove the drum unit (2 screws).

   NOTE: Cover the drum with some sheets of paper to prevent the drum from being exposed to light.
6. Disconnect the connector [A] (CN413) from the ac drive board [B] (3 wire clamps).
7. Remove the quenching lamp [C] from the copier frame as shown.

NOTE: Do not use alcohol to clean the quenching lamp. This damages the resin in the covers of the LEDs.

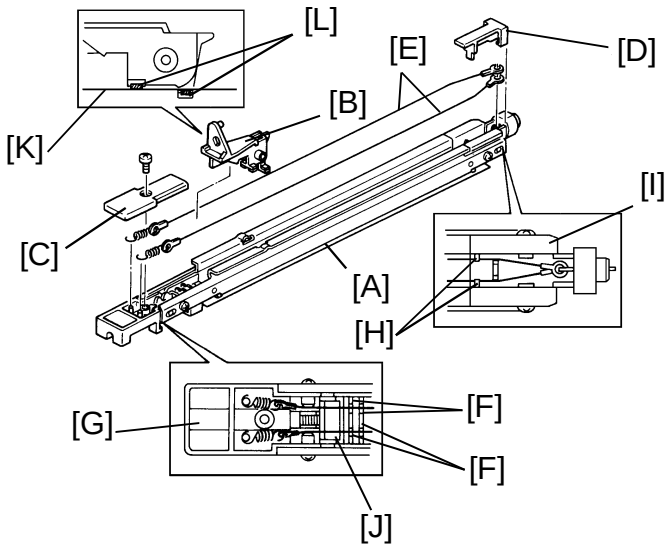
6.3 ERASE LAMP REPLACEMENT



1. Remove the upper rear cover (2 screws).
2. Remove the main board [A] (all connectors and 3 locking supports).
3. Remove the erase lamp [B] (1 screw).

NOTE: Do not use alcohol to clean the erase lamp. This damages the resin in the covers of the LEDs.

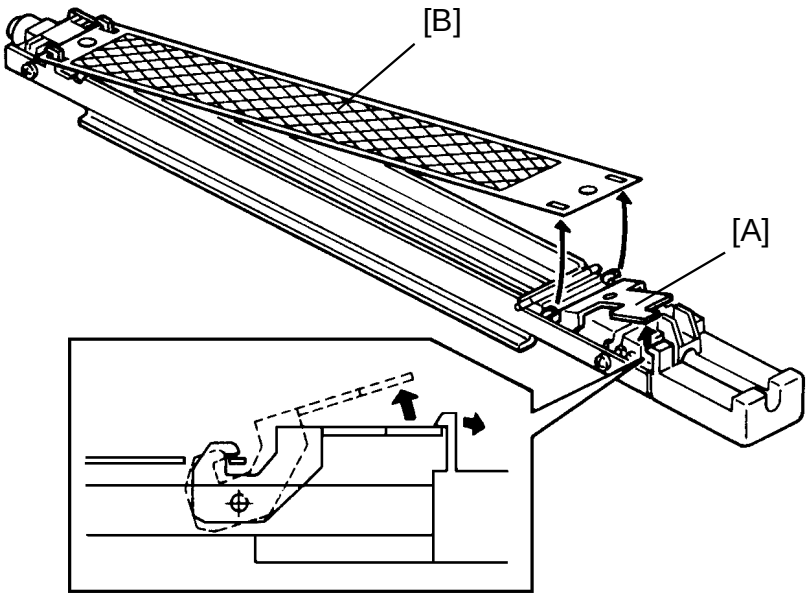
6.4 CHARGE CORONA WIRE REPLACEMENT



1. Open the front cover.
2. Remove the charge corona unit [A] together with the wire cleaner [B] (1 screw).
3. Remove the wire cleaner from the charge corona unit.
4. Remove the front endblock cover [C] (1 screw) and the rear endblock cover [D].
5. Unhook the springs from the corona wires [E] and replace the wires.

NOTE: a) The new corona wires must be in the grooves [F] of the front endblock [G] and must be underneath the projections [H] of the rear endblock [I] as shown.
b) The height adjuster [J] must be positioned underneath the corona wires.
c) Do not handle the new corona wires with bare hands. Oil on the wire may cause uneven charge on the drum.
d) Do not rub the corona wires with rough material (sandpaper, etc.) as this will damage the corona wires.
e) When removing the endblock covers, be careful not to break off the side hooks.
f) Do not use any solvents to clean the wires as this will cause uneven charge on the drum.
g) Do not damage the grid plate when replacing the corona wires.
h) When installing the charge corona unit, make sure that the wires [K]
are positioned between the cleaner pads [L].

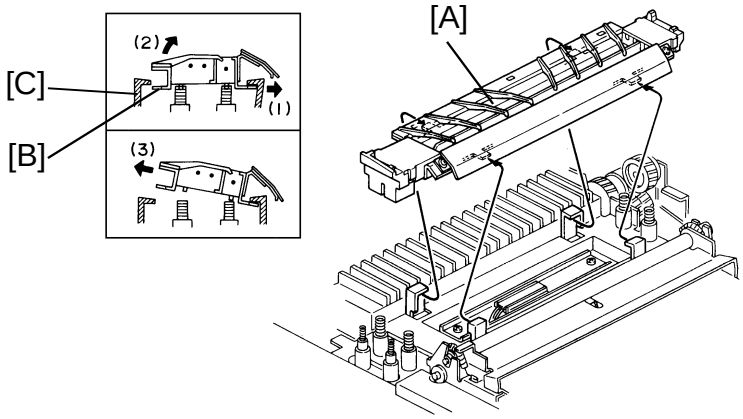
6.5 CHARGE CORONA GRID PLATE REPLACEMENT

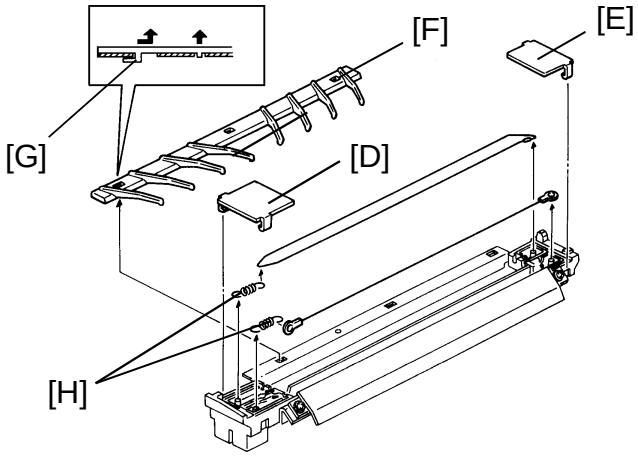


1. Open the front cover.
2. Remove the charge corona unit together with wire cleaner (1 screw).
3. Unhook the grid plate anchor [A].
4. Remove the grid plate [B] as shown.

NOTE: a) Oils and chemicals from your hands will deteriorate the grid plate.
b) Do not bend the grid plate. This can result in an uneven charge.
c) When installing the charge corona unit, make sure that the corona wires are positioned between the cleaner pads (See Charge Corona Wire Replacement).

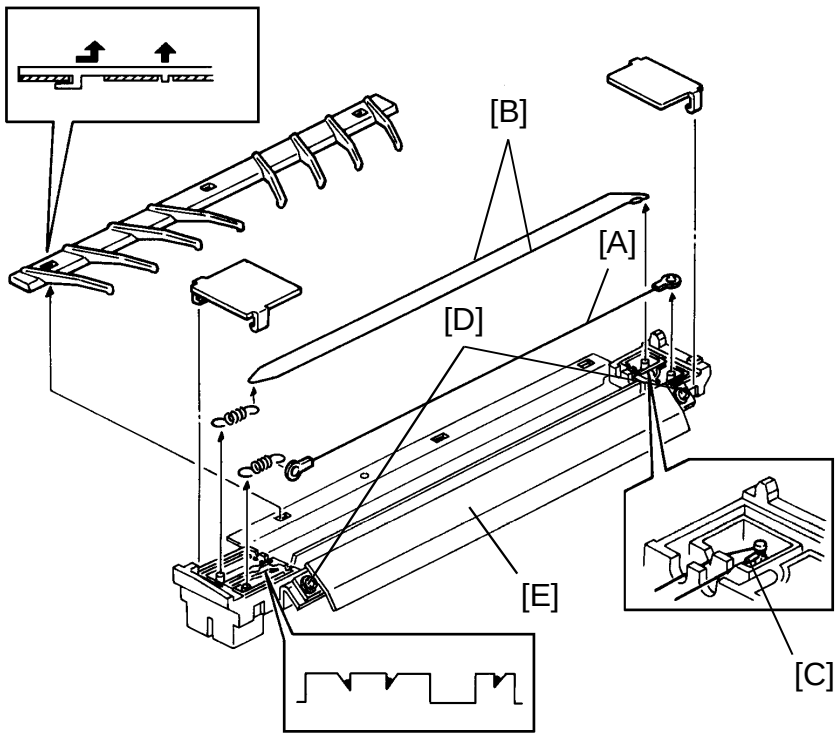
6.6 TRANSFER/SEPARATION CORONA WIRE REPLACEMENT





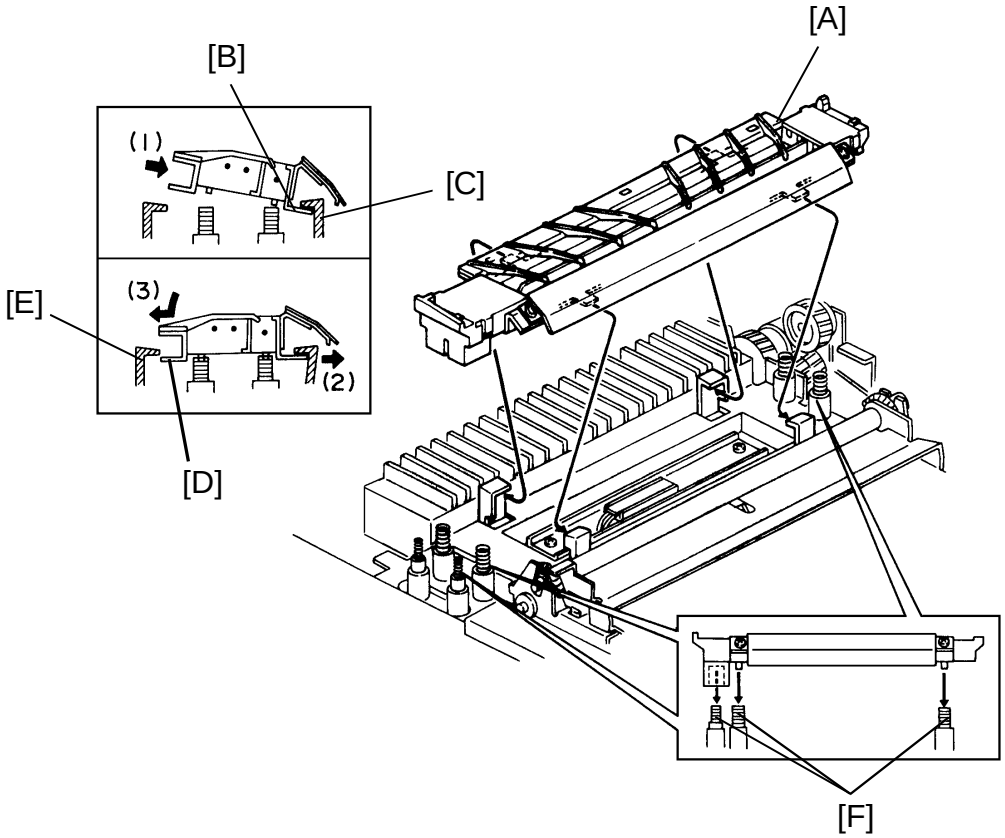
1. Open the front cover.
2. Open the upper unit by pushing the release lever.
3. Pull the transfer/separation (TC/SC) corona unit [A] toward the registration roller side (1) and release the left positioning tabs [B] of the TC/SC unit from the left holders [C] in the transport unit (2). Then, take out the TC/SC unit (3) as shown.
4. Remove the following parts:
   - TC/SC unit front endblock cover [D]
   - TC/SC unit rear endblock cover [E]
   - TC/SC unit paper guide [F]

   NOTE: When reinstalling the TC/SC unit paper guide, verify that all three tabs [G] are properly latched in place.
5. Unhook the springs [H] from the wires.



6. Replace the transfer corona wire [A] and the separation corona wire [B].

NOTE:
a) When installing the separation corona wire, make sure that the wire junction [C] is positioned inside the rear endblock.
b) The transfer and separation corona wires must be in the grooves of the front and rear endblock as shown.
c) Do not handle new corona wires with bare hands. Oil on the wire may cause an uneven charge condition.
d) Rubbing the corona wires with a rough material (sandpaper, etc.) will damage the corona wires.
e) When removing the endblock covers, be careful not to break off the side hooks.
f) Do not use any solvents to clean the wires as this will cause uneven charge on the drum.
g) Do not loosen the screws [D] of the transfer entrance guide [E]. The transfer entrance guide is positioned with a special tool at the factory.



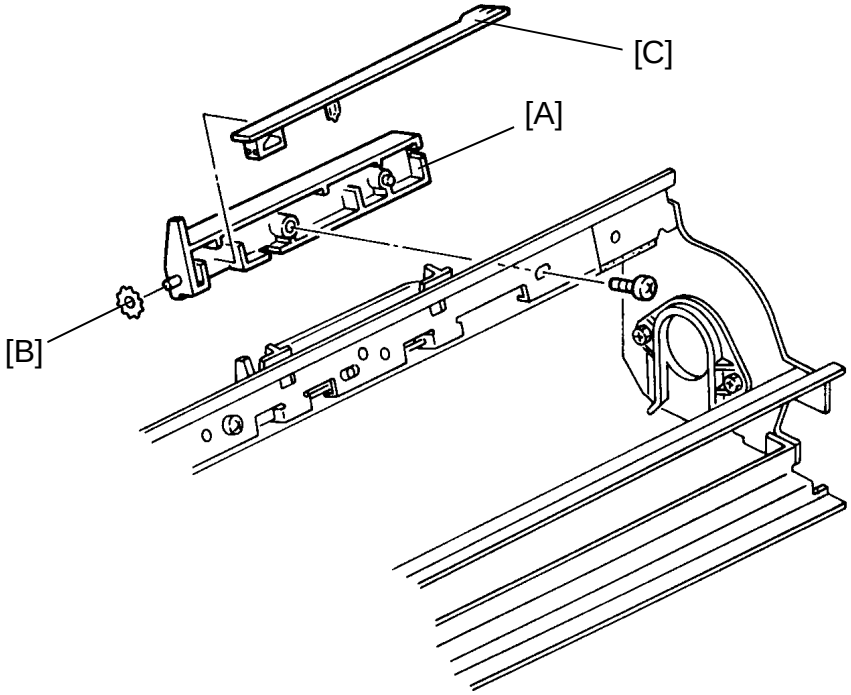
7. Reinstall the TC/SC corona unit [A].

NOTE: a) When reinstalling the TC/SC corona unit, first set the right positioning tabs [B] of the TC/SC corona unit into the right holders [C] in the transport unit, then set the left positioning tabs [D] into the left holders [E] by pulling the TC/SC corona unit towards the registration roller side.

b) Make sure that the four positioning tabs of the TC/SC corona unit fit into the holders in the transport unit as shown.

c) Make sure that six springs [F] are correctly positioned underneath the TC/SC corona unit as shown.

6.7 ID SENSOR REPLACEMENT



1. Remove the drum unit, then remove the drum from the unit. (See Drum Replacement.)

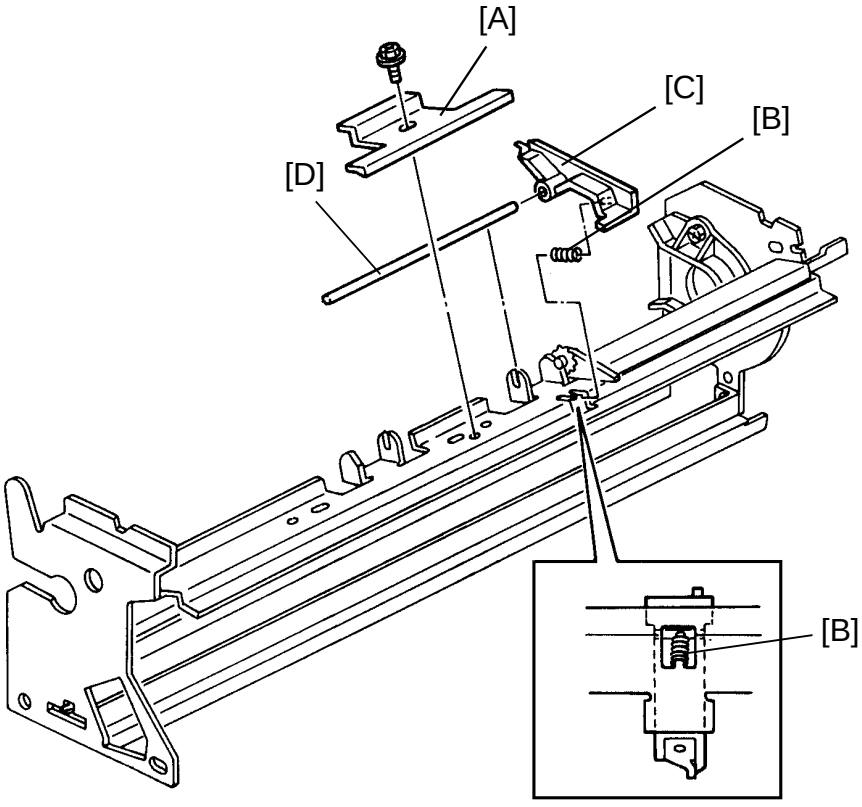
   NOTE: Cover the drum with paper to prevent the drum from being exposed to light.

2. Remove the ID sensor holder [A] (1 screw).

   NOTE: Do not lose the spur [B] on the ID sensor holder.

3. Replace the ID sensor board [C].
4. Reinstall the drum unit.
5. Perform the ID sensor (Vsg) adjustment (SP54) and check the copy quality.

6.8 PICK-OFF PAWL REPLACEMENT



1. Remove the drum unit, then separate the drum from the unit. (See Drum Replacement.)

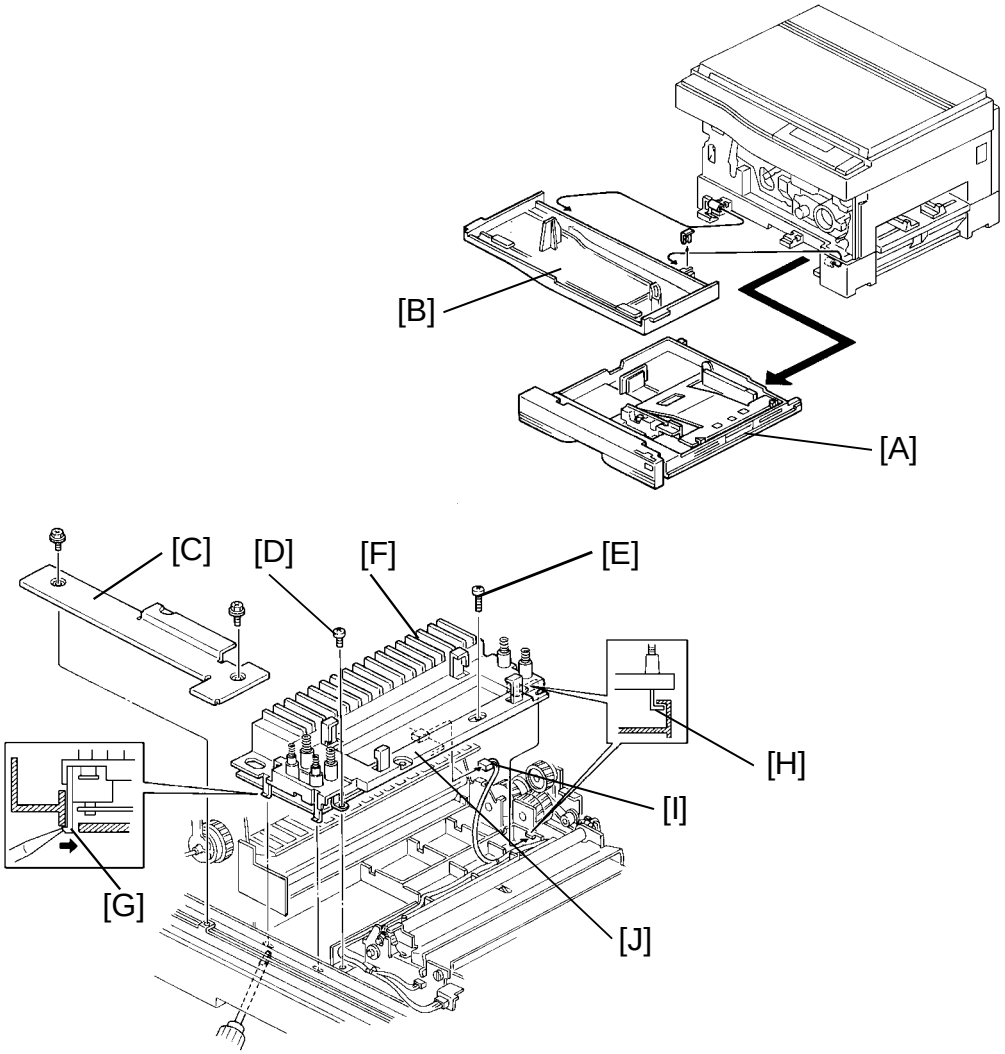
   NOTE: Cover the drum with paper after removing it from the drum unit. This prevents the drum from being exposed to light.

2. Remove the pick-off pawl bracket [A] (1 screw).

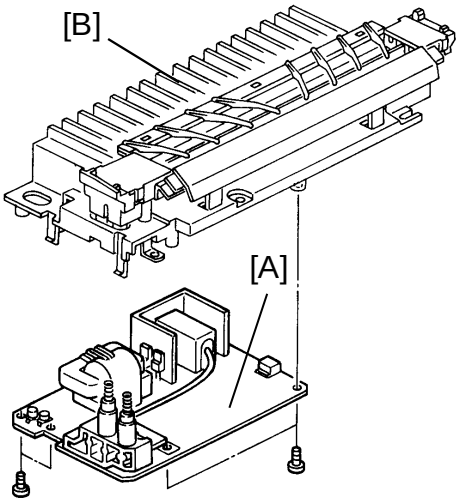
3. Remove the spring [B], then remove the pick-off pawl [C] from the shaft [D].

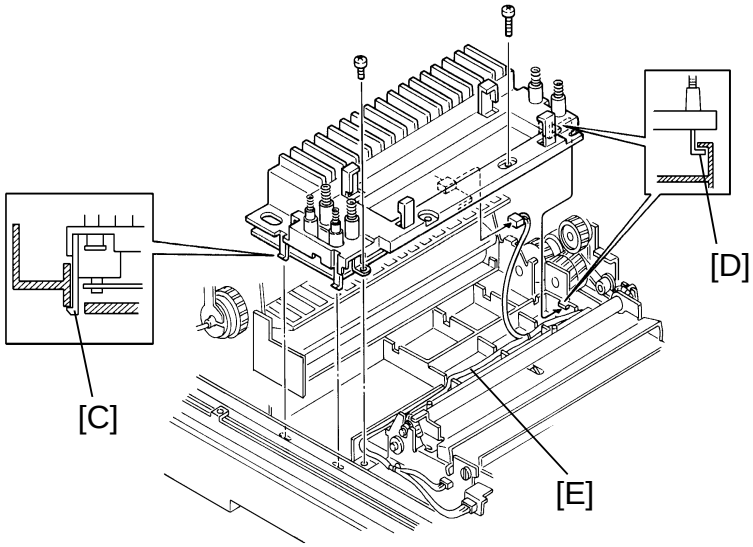
   NOTE: When replacing the new pick-off pawl, make sure that the spring is positioned correctly as shown in the illustration.

6.9 TRANSFER/SEPARATION POWER PACK REPLACEMENT



1. Remove the paper tray [A].
2. Remove the front cover [B] (1 snap ring).
3. Remove the drum unit. (See Drum Replacement.)
4. Remove the transfer/separation corona unit. (See Transfer/Separation Corona Wire Replacement.)
5. Remove the harness cover [C] (2 screws).
6. Remove 2 screws (1 grounding screw [D], 1 screw [E]).
7. Lift the transport unit [F] by removing the front [G] and rear [H] hooks and remove the 4P connector [I] from the transfer/separation (T/S) power pack [J]. Then take out the transport unit.





8. Remove the T/S power pack [A] from the transport unit [B] (4 screws).

   NOTE: a) When reinstalling the transport unit in the copier, make sure the front [C] and rear [D] hooks are positioned correctly as shown.

   b) When reinstalling the transport unit, make sure that the relay harness [E] does not catch in the transport unit and is positioned correctly as shown.

9. Adjust the transfer and separation corona currents. (See Transfer Corona Current Adjustment and Separation Corona Current Adjustment.)

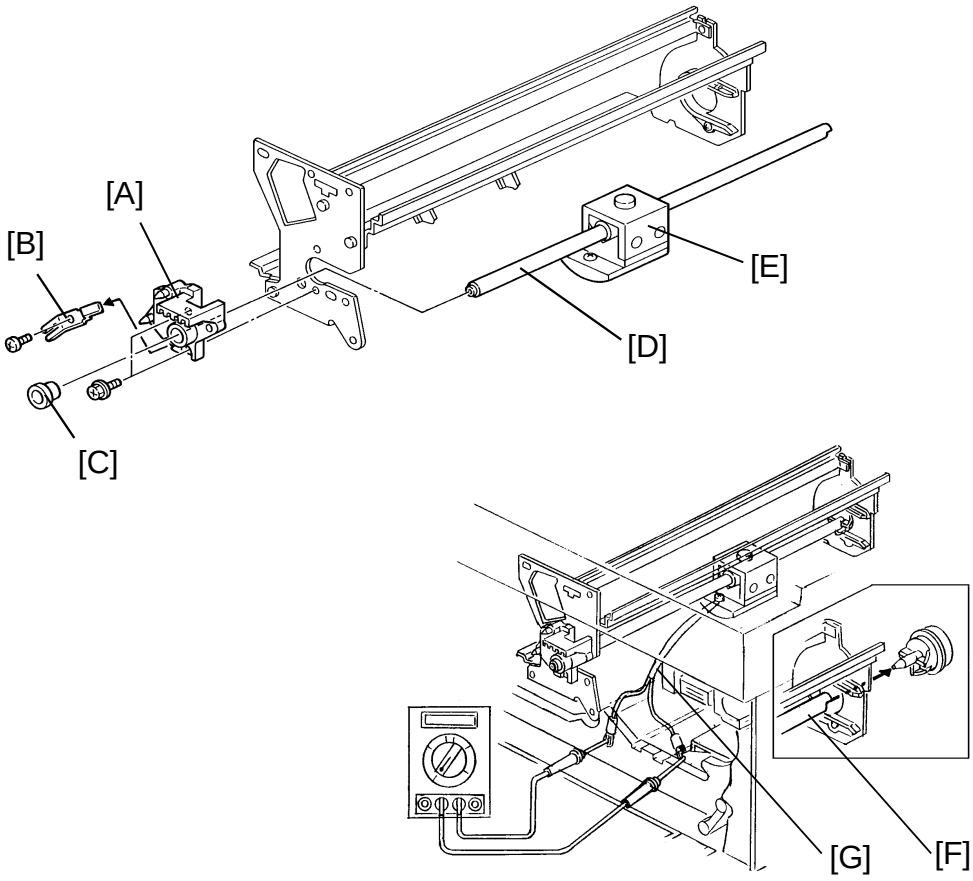
6.10 CORONA CURRENT ADJUSTMENT

NOTE: The corona current varies with environmental conditions such as humidity and atmospheric pressure. The corona current is adjusted at the factory and is suitable under a wide range of environmental conditions. Corona current adjustment is necessary whenever the power packs are replaced. Adjustment may also be necessary to correct problems with paper separation, toner transfer, or image density.

CAUTION: – Make sure that SP9 is cleared before you change the range on the digital multimeter. If not, the multimeter may be damaged.
– High voltage is applied to the corona wires. Be careful.

– Preparation –

1. Turn off the main switch and remove the following parts:
    - Upper Inner Cover
    - Development Unit
    - Cleaning Unit
    - Charge Corona Unit
    - TC/SC Corona Unit
    - Drum Unit
2. Clean or replace each corona wire and clean the corona units with water or alcohol.
3. Remove the upper rear cover (2 screws).

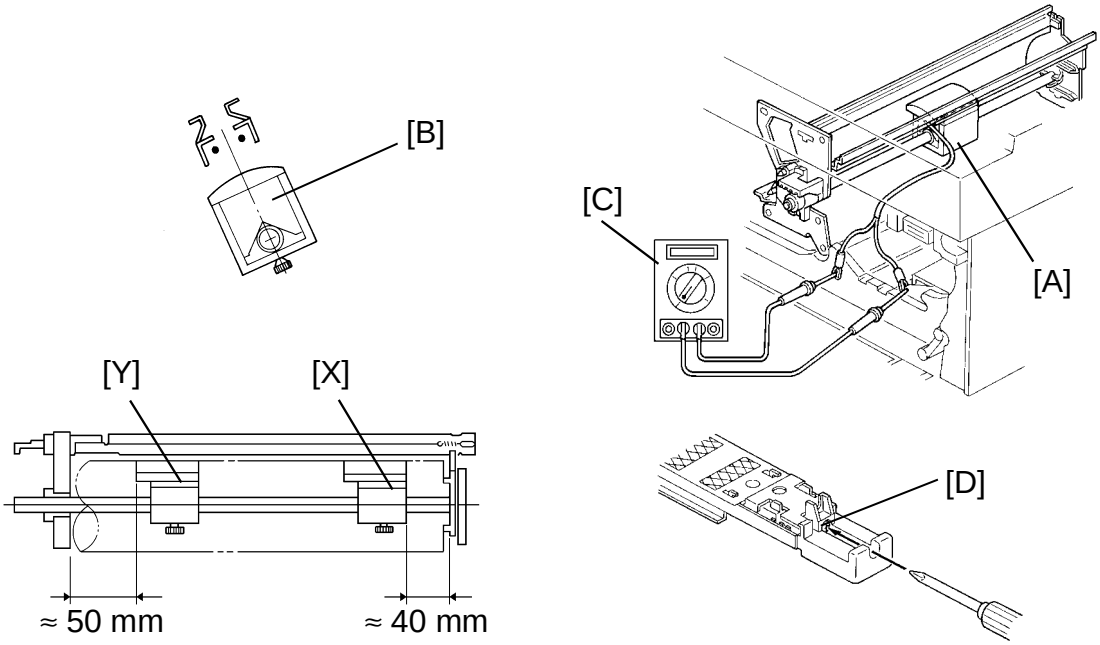


NOTE: Do steps 4 – 10 before adjusting the transfer corona current, separation corona current or charge corona wire height:

4. Remove the drum from the drum unit. Cover the drum with paper. (See Drum Replacement.)
5. Remove the drum holder [A] (2 screws) and the grounding plate [B] (1 screw).
6. Attach the drum shoe shaft adapter [C] to the drum holder.
7. Attach the drum shaft [D] and drum shoe [E] to the drum unit as shown.

   NOTE: Be careful not to injure your hand on the edge of the pick-off pawls.
8. Reinstall the drum unit with the shaft rear end [F] positioned as shown in the illustration. Pass the harness [G] down into the development unit opening.
9. Secure the drum unit (2 screws).
10. Connect the negative harness lead to the copier frame as shown above, then connect both multimeter leads as shown to the harness leads.

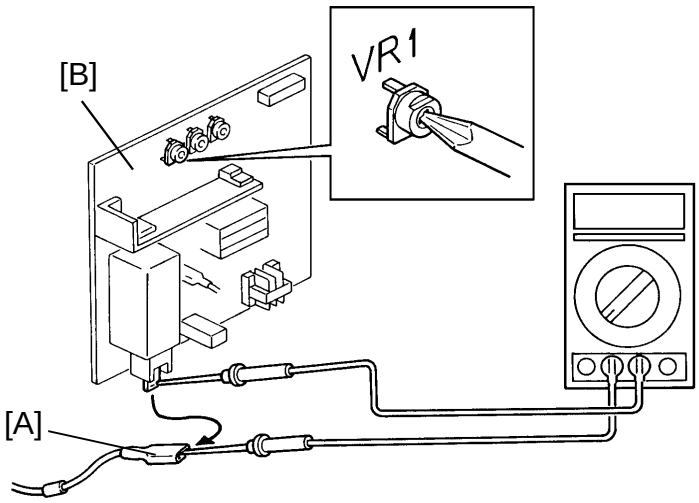
6.10.1 Charge Corona Current Adjustment (SP9-2)



– Wire Height Adjustment –

NOTE: If the copy image is uneven from side-to-side in black solid areas after the front end block of the charge corona unit is replaced, check and adjust the wire height as follows:

1. Attach the drum shaft and drum shoe to the drum unit and install the drum unit in the machine. (See Drum Current Adjustment Preparation.)
2. Slide the drum shoe [A] to the rear limit [X] as shown.
3. Position the drum shoe so that the axis of the current detection plate [B] is aligned with the charge corona wires as shown.
4. Reinstall the charge corona unit on the drum unit.
5. Select the dc 200 μA range on the digital multimeter [C].
6. Turn on the main switch and close the front cover safety switch.
7. Turn on the charge corona using SP9-2.
8. Note the reading. (Wait at least 30 seconds for the current to stabilize.)
9. Press the Clear/Stop key to turn off the charge corona, then move the drum shoe to the front limit [Y] as shown and repeat steps 3 to 8.
10. Adjust the front corona wire height by turning the adjusting screw [D] if the two readings are different.
11. Repeat steps 2 to 10 until the difference between the front and rear reading is no more than 4%.



– Charge Corona Current Adjustment –

ADJUSTMENT STANDARD	Adjusting VR	SP mode
DC – 400 ± 3 µA	VR1	SP9-2

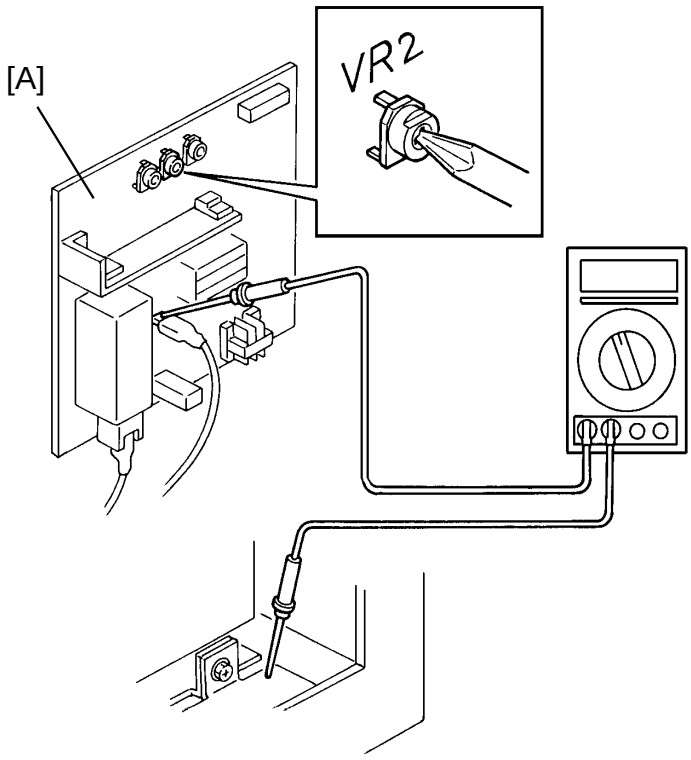
NOTE: 1) VR1 on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRM when the CC/Grid/Bias power pack is replaced.

2) Keep the high voltage wire terminal [A] away from the copier frame. Otherwise, electrical leakage may interfere with current measurement.

1. Turn off the main switch.
2. Disconnect the charge corona terminal [A] from the CC/Grid/Bias power pack [B].
3. Select the dc 2mA range on the digital multimeter.
4. Connect the multimeter leads as shown, then measure the charge corona current.

   NOTE: Keep the multimeter leads away from the main board.
5. Turn on the main switch, close the front cover safety switch and turn on the charge corona using SP9-2.
6. Adjust the charge corona current to –400 ± 3 µA by turning VR1 on the CC/Grid/Bias power pack.
7. Press the Clear/Stop key and turn off the main switch.

6.10.2 Grid Voltage Adjustment (SP9-48)



ADJUSTMENT STANDARD	Adjusting VR	SP mode
DC –880 ± 10 V	VR2	SP9-48

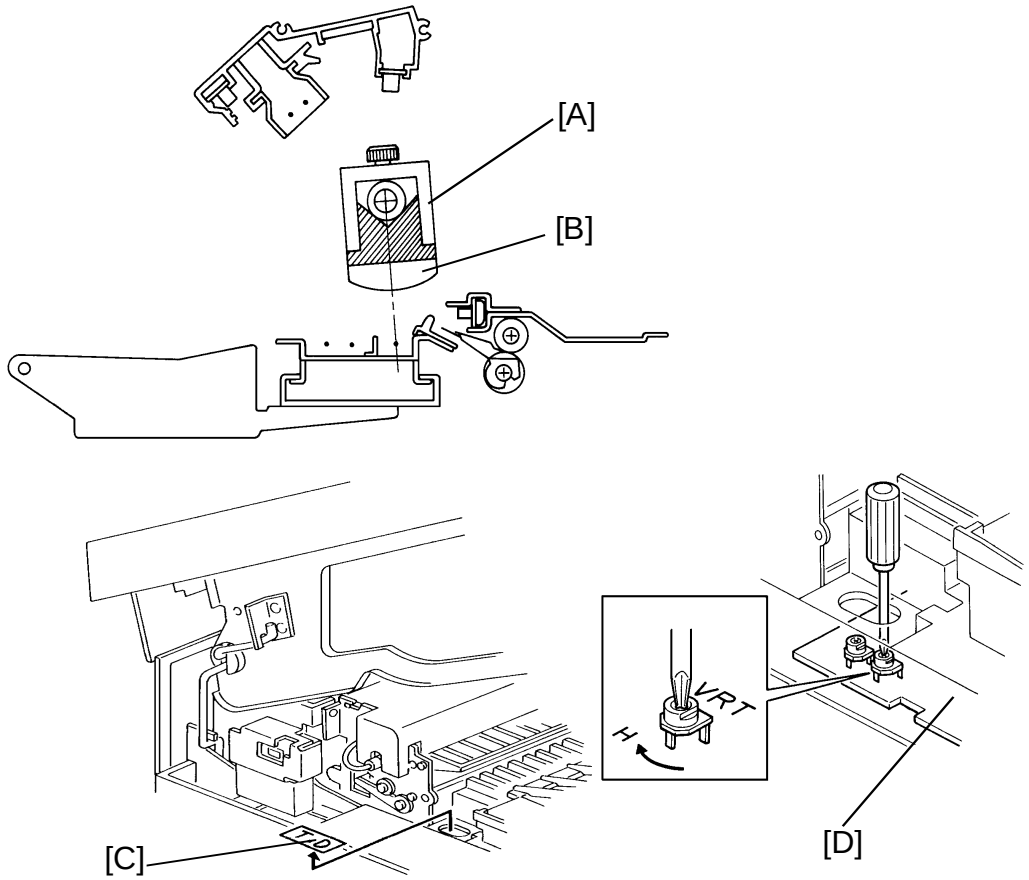
NOTE: VR2 on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRG when the CC/Grid/Bias power pack is replaced.

1. Set the multimeter range to dc 1500 V and connect the multimeter leads as shown.

   NOTE: Keep the multimeter leads away from the main board.

2. Turn on the main switch, close the front cover safety switch, and turn on the grid voltage using SP9-48.
3. Adjust the grid voltage to –880 ± 10 V by turning VR2 on the CC/Grid/Bias power pack [A].
4. Press the Clear/Stop key and turn off the main switch.

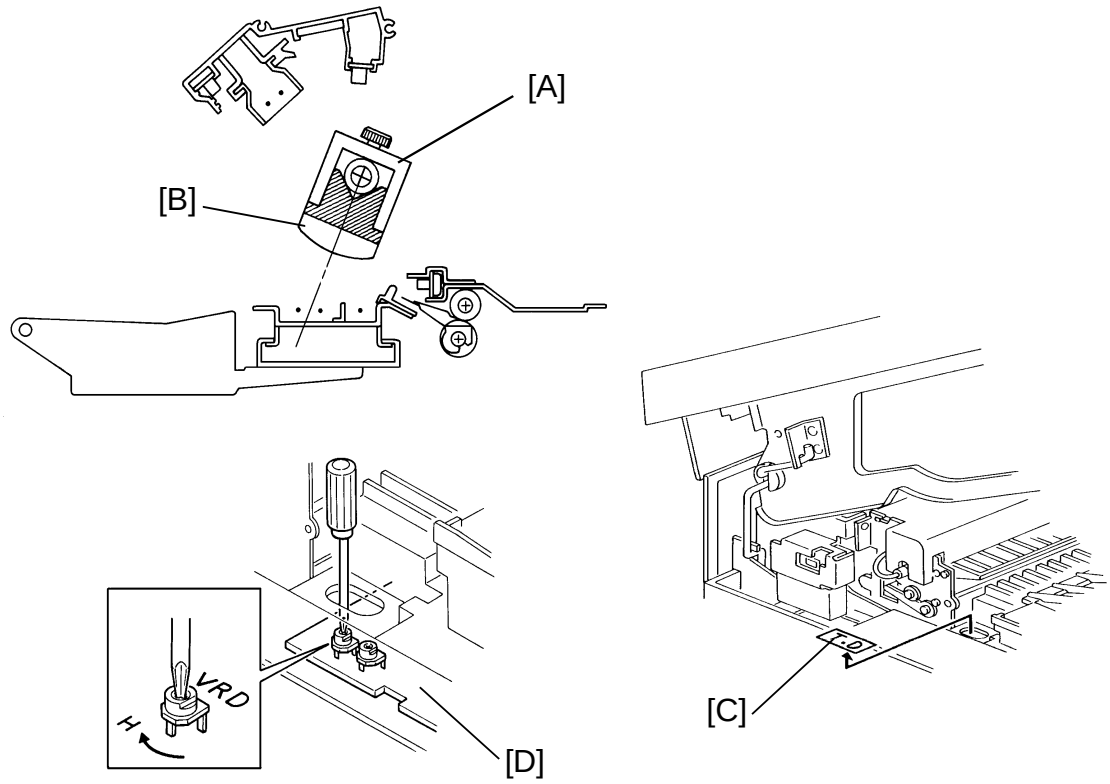
6.10.3 Transfer Corona Current Adjustment (SP9-5)



ADJUSTMENT STANDARD	Adjusting VR	SP mode
DC –31.0 ± 0.5 μA	VRT	SP9-5

1. Reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current detection plate [B] is aligned with the transfer corona wire as shown.
2. Remove the seal [C] from the transport unit.
3. Select the dc 200 μA range on the digital multimeter.
4. Turn on the main switch, close the front cover safety switch, and turn on the transfer corona using SP9-5.
5. Adjust the transfer corona current to dc –31.0 ± 0.5 μA using VRT on the TC/SC power pack [D].
6. Press the Clear/Stop key and turn off the main switch.

6.10.4 Separation Corona Current Adjustment (SP9-6)



ADJUSTMENT STANDARD	Adjusting VR	SP mode
AC 49 ± 1.0 μA	VRD	SP9-6

1. Reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current detection plate [B] is aligned with the separation corona wire as shown.

   NOTE: Make sure that the drum shoe does not touch the pick-off pawls.

2. Remove the seal [C] from the transport unit.

3 Select the ac 200 μA range on the digital multimeter.

4. Turn on the main switch, close the front cover safety switch, and turn on the separation corona using SP9-6.

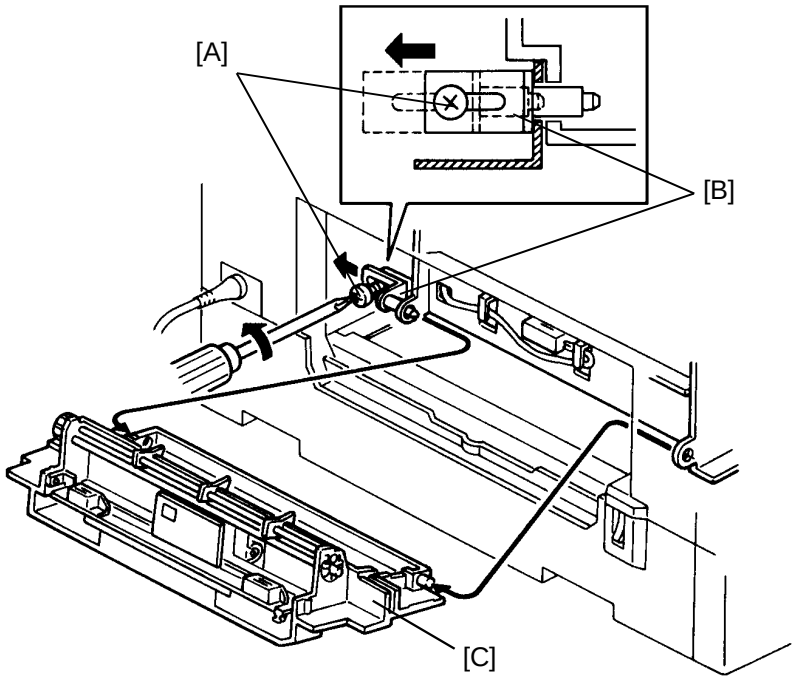
5. Adjust the separation corona current to ac 49 ± 1.0 μA using VRD on the TC/SC power pack [D].

6. Press the Clear/Stop key and turn off the main switch.

REPLACEMENT AND ADJUSTMENT

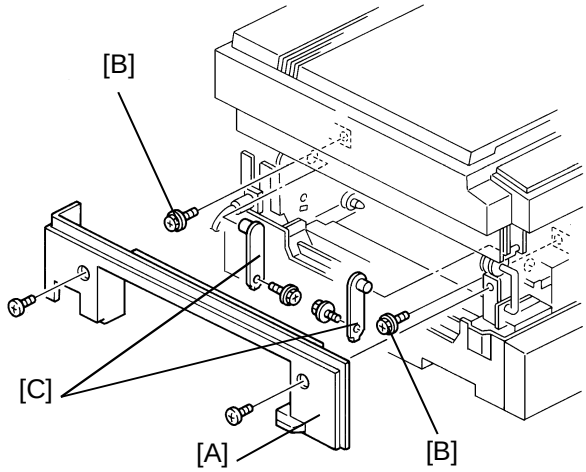
7. FUSING

7.1 EXIT UNIT REMOVAL



1. Remove the copy tray.
2. Loosen the screw [A] in the rear holder [B].
3. Slide the rear holder toward the rear side and remove the exit unit [C].

7.2 FUSING UNIT REMOVAL

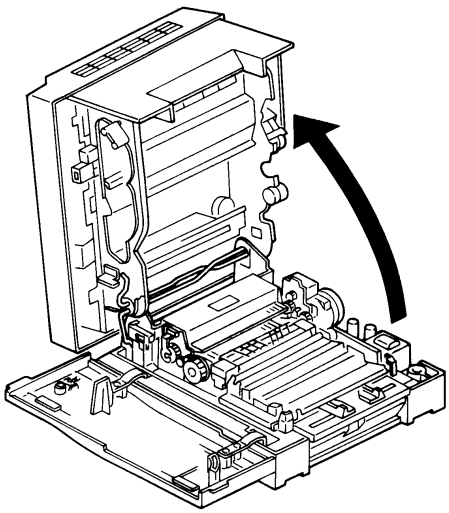


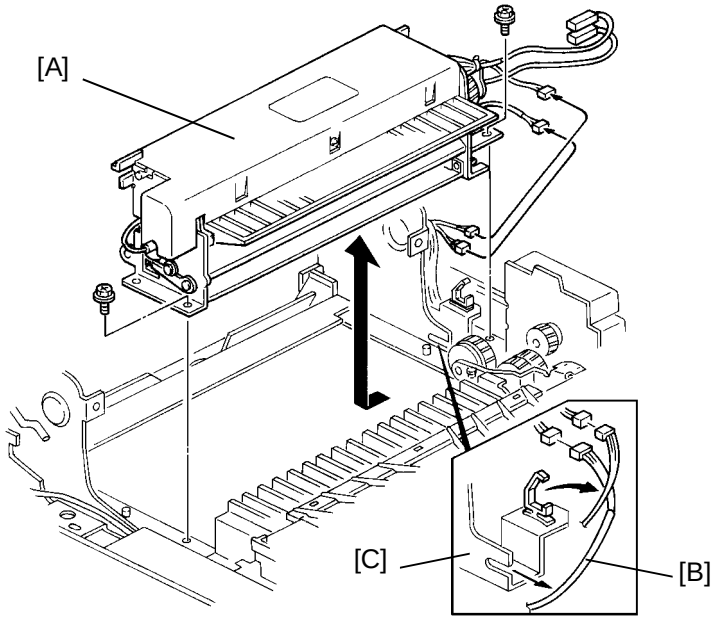
1. Make sure that the main switch is turned off and the power supply cord is unplugged.
2. Remove the platen cover or DF.
3. Open the front cover.
4. Remove the following covers and units.

   Development unit
   Charge corona unit and wire cleaner
   Cleaning unit
   Upper rear cover
   Upper left cover [A]

5. Hold down the top of the upper unit and open the upper unit by pushing the release lever.
6. Remove the inner cover and pull out the drum unit (2 screws).

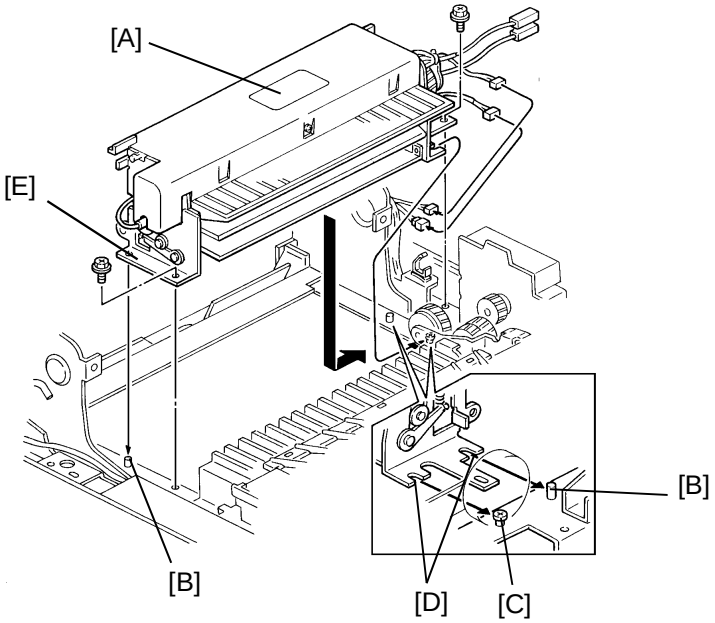
   NOTE: Cover the drum with some sheets of paper to prevent the drum from being exposed to light.
7. Close the upper unit.
8. Remove the exit unit. (See Exit Unit Removal.)
9. Remove the two screws [B] securing the fusing unit.
10. Remove the front and rear upper unit stoppers [C] (1 screw each).

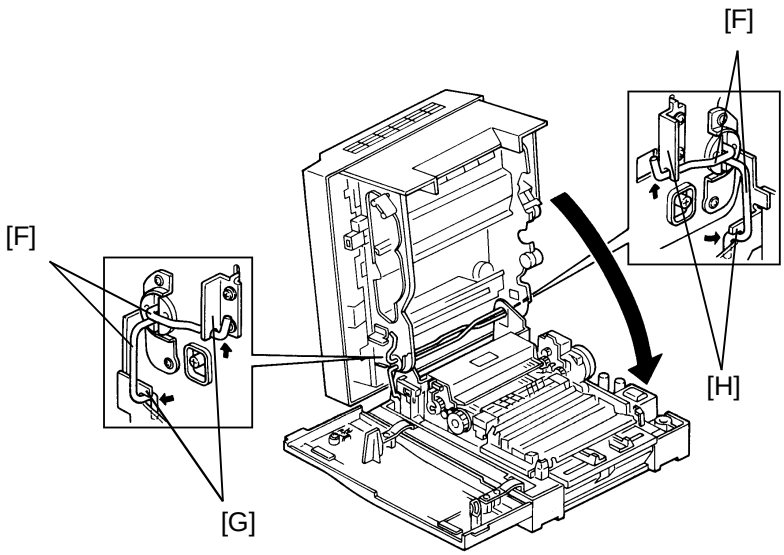




11. Open the upper unit gently while holding it until the upper unit stops at the 90° position as shown.
12. Free the four fusing harnesses and remove the unit [A] as shown (2 screws).

    NOTE: Make sure the 3P connector harness [B] is free from the notch [C] in the frame before removing the fusing unit.



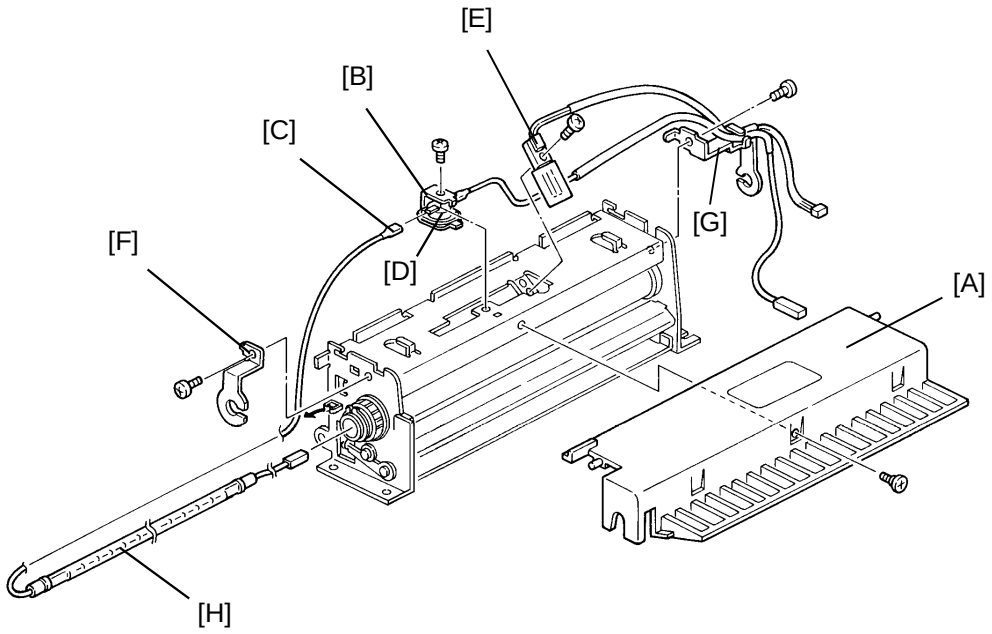


13. Reassemble.

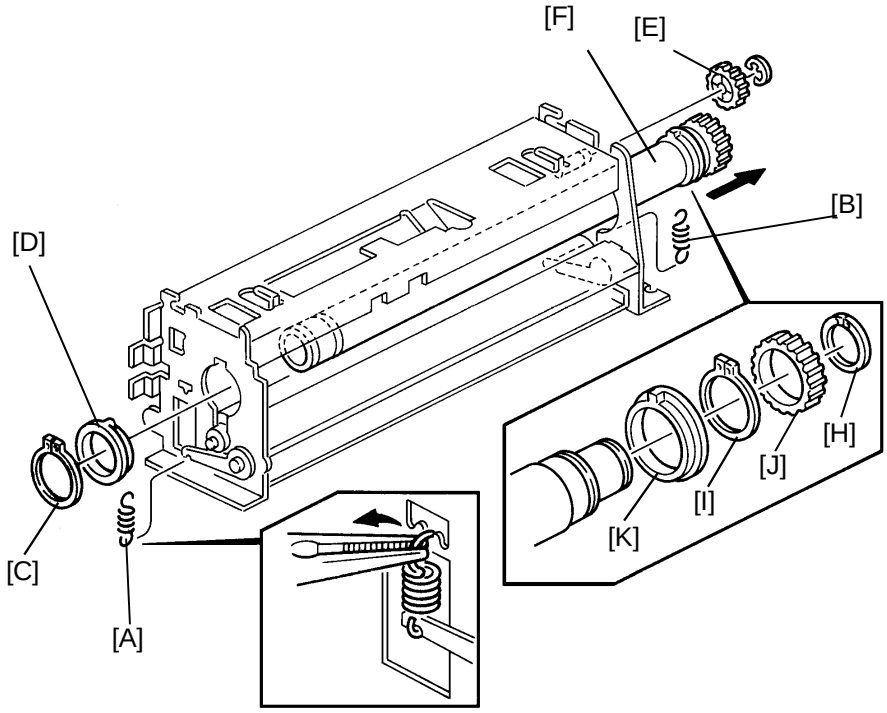
NOTE: 1) When reinstalling the fusing unit [A], make sure that the two positioning pins [B] and the positioning screw [C] fit through the two notches [D] and the hole [E] in the fusing frame.

2) When closing the upper unit, make sure that the torsion bars [F] are positioned on the front [G] and rear [H] brackets as shown.

7.3 HOT ROLLER REPLACEMENT



1. Remove the exit unit. (See Exit Unit Removal.)
2. Remove the fusing unit. (See Fusing Unit Removal.)
3. Remove the fusing cover [A] (1 screw).
4. Remove the thermoswitch bracket [B] (1 screw).
5. Disconnect the connector [C] of the fusing lamp from the thermoswitch [D].
6. Remove the thermistor [E] (1 screw).
7. Remove the front [F] and rear [G] support brackets of the fusing lamp (1 screw each).
8. Pull the fusing lamp [H] out of the front end of the hot roller.



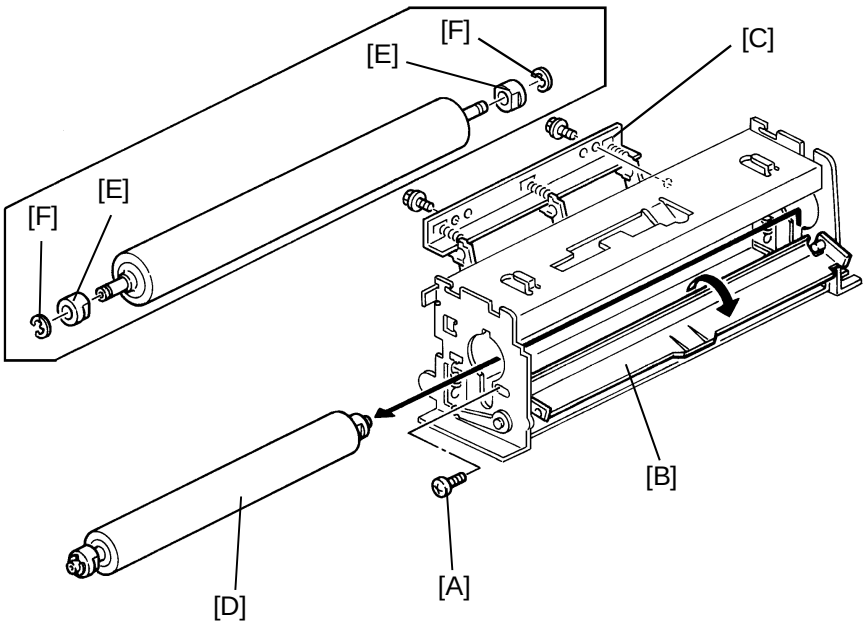
9. Remove the front [A] and rear [B] pressure springs.
10. Remove 1 C-ring [C] and 1 bearing [D] (front side).
11. Remove the relay gear [E] (1E-ring).
12. Slide the hot roller [F] to the rear.
13. Replace the hot roller (2 C-rings [H, I], 1 gear [J], 1 bearing [K]).
14. Install the new hot roller.

NOTE: a) Peel off 3 cm (1 inch) from both ends of the protective sheet on the new hot roller before installing it.

b) Before reinstalling the pressure springs, remove the rest of the protective sheet.

c) Before reinstalling the pressure springs, refer to the Fusing Pressure Adjustment Section.

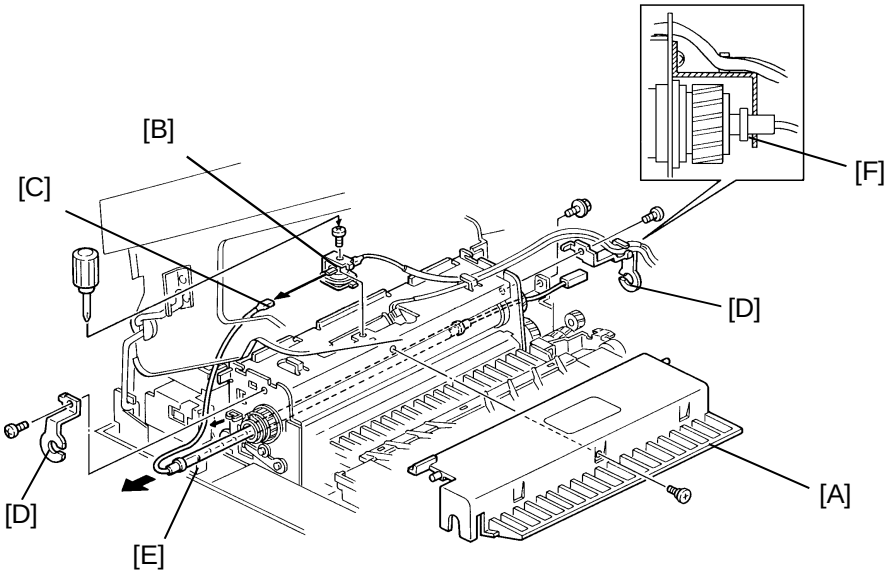
7.4 PRESSURE ROLLER REPLACEMENT



1. Remove the hot roller. (See Hot Roller Replacement.)
2. Remove screw [A] securing the fusing entrance guide [B].
3. Turn the entrance guide clockwise as shown.
4. Remove the pick-off pawl securing bracket [C] (2 screws).
5. Remove the pressure roller [D].
6. Remove the bearings [E] and E-rings [F] from the pressure roller.

   NOTE: Before installing the pressure springs, refer to the Fusing Pressure Adjustment Section.

7.5 FUSING LAMP REPLACEMENT



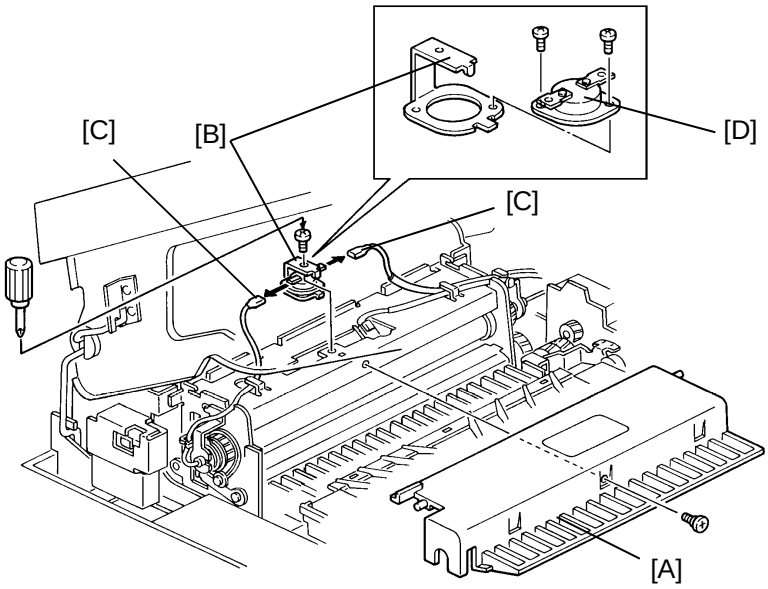
1. Make sure that the main switch is turned off and the power supply cord is unplugged.
2. Remove the drum unit. (See Drum Replacement.)
3. Remove the fusing cover [A] (1 screw).
4. Remove the thermoswitch bracket [B] (1 screw).
5. Disconnect the connector [C] of the fusing lamp from the thermoswitch.
6. Remove the upper rear cover (2 screws).
7. Remove both front and rear fusing lamp support brackets [D] (1 screw each).
8. Disconnect the fusing lamp connector from the ac drive board and pull the fusing lamp [E] out of the front end of the hot roller.

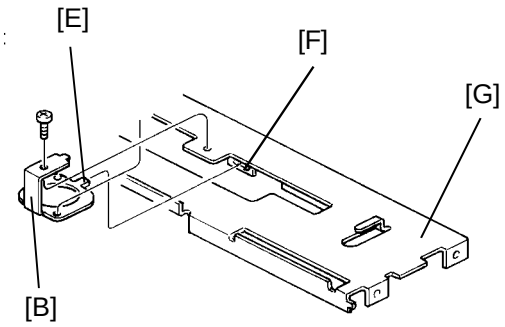
NOTE: a) Do not touch the fusing lamp with bare hands.

b) Slide the new fusing lamp into the hot roller through the opening at the front of the roller.

c) Make sure that the fusing lamp insulators [F] (front and rear) are properly set in the holders as shown.

7.6 FUSING THERMOSWITCH REPLACEMENT

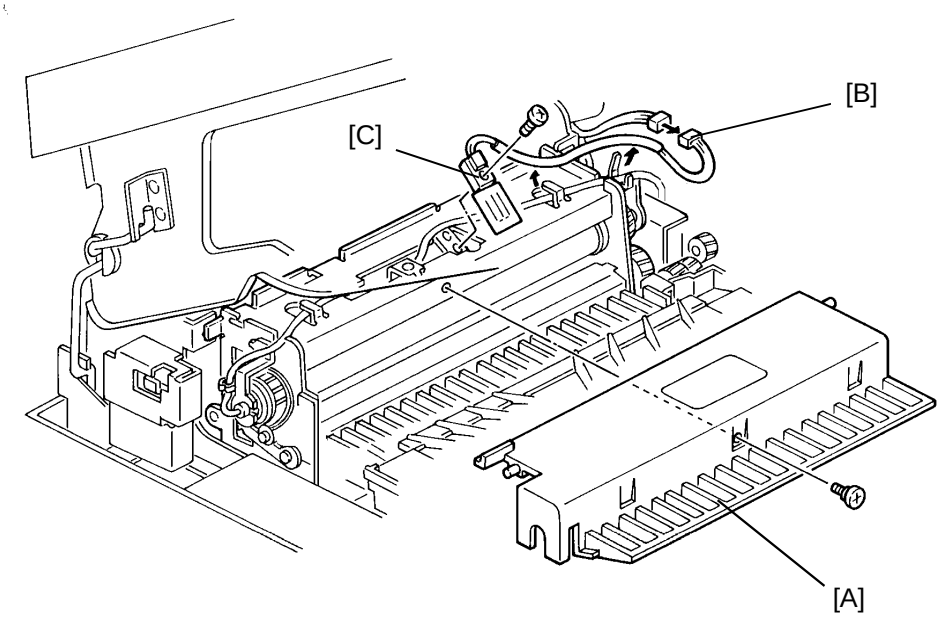




1. Turn off the main switch and unplug the power supply cord.
2. Remove the drum unit. (See Drum Replacement.)
3. Remove the fusing cover [A] (1 screw).
4. Remove the thermoswitch bracket [B] (1 screw).
5. Disconnect the two thermoswitch connectors [C].
6. Remove the thermoswitch [D] from the bracket (2 screws).

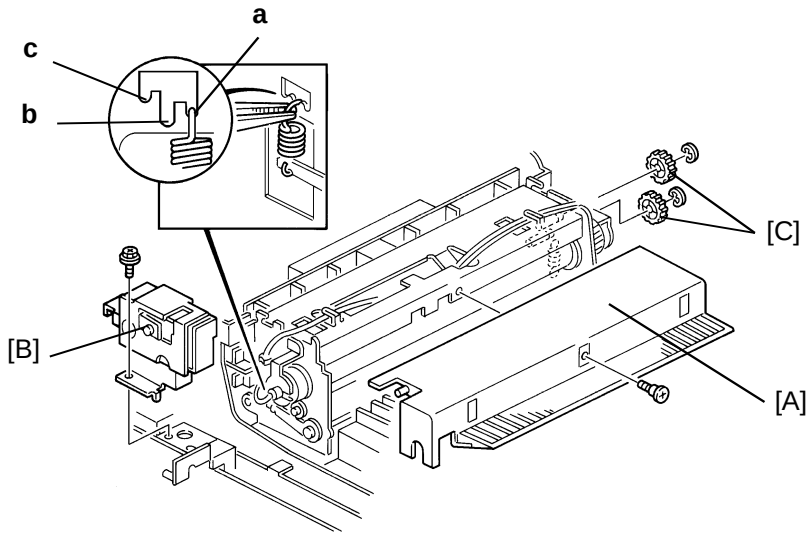
NOTE: When installing the thermoswitch bracket [B], make sure that the projection [E] on the thermoswitch bracket enters into the hole [F] on the fusing unit frame [G].

7.7 FUSING THERMISTOR REPLACEMENT



1. Turn off the main switch and unplug the power supply cord.
2. Remove the drum unit. (See Drum Replacement.)
3. Remove the fusing cover [A] (1 screw).
4. Remove the upper rear cover (2 screws).
5. Disconnect the thermistor connector [B] (2 harness clamps).
6. Remove the thermistor [C] (1 screw).

7.8 FUSING PRESSURE ADJUSTMENT



1. Turn off the main switch and unplug the power supply cord.
2. Open the front cover.
3. Open the upper unit by pushing the release lever.
4. Remove the fusing unit cover [A] (1 shoulder screw).
5. Remove the inner cover (5 screws).
6. Remove the front safety switch bracket [B] (1 screw).
7. Remove the upper and lower rear covers (2 screws each).
8. Remove the ac drive board bracket with the ac drive board (2 screws and all ac harness connectors).
9. Remove the 2 relay gears [C] on the fusing unit (1E-ring each).
10. Adjust the fusing pressure spring position as follows:

Fusing pressure adjustment combinations

Spring position setting	
a	Factory setting
b	Weaker
c	Stronger

The fusing pressure can be set at three different levels. Adjust the pressure spring position to a stronger setting if poor fusing occurs. If copies subsequently get creased or jams occur in the fusing unit, spring.

8. COPY QUALITY ADJUSTMENT

– General Information –

Image density is affected by the following factors:

(1) Light Intensity
(2) Bias Voltage
(3) Toner Density
(4) Grid Voltage
(5) Charge Corona Current

The items listed above must be kept in balance to maintain correct image density.

In the field, image density should be adjusted first by changing the exposure lamp voltage. If results are unsatisfactory, the bias voltage can be changed. Also, if requested from the customer, the overall image density can be changed by changing the toner density. Normally, this should be kept at the normal position (factory setting).

The grid voltage and charge corona current are carefully adjusted at the factory. Any adjustment out of the adjustment standard will result in overtoning, toner scattering, dirty background, or light image density problems. The grid voltage and charge corona current adjustment should be done only when replacing the CC/Grid/Bias power pack or to correct certain problems with image density after checking all other possible causes.

8.1 LIGHT INTENSITY ADJUSTMENT

When:	1. Every Call 2. When replacing the following parts Exposure Lamp AC Drive Board Main Board Drum Auto Image Density Sensor
Purpose:	To maintain the correct light intensity.
Adjustment Standard:	Level 2 (E0.2) of the gray scale on the OS-A4 chart should be slightly visible on the copy when the 4th manual image density level is selected.
How to Adjust:	SP48
How it works:	Changes the ac drive board output voltage.

1. Turn off the main switch.
2. Clean the following parts:

Item No.	Section	Method
(1)	Optics (mirrors, lens, reflectors, shield glass, exposure glass)	Damp cotton, silicone cloth, and blower brush
(2)	ID sensor	Blower brush
(3)	Corona wires (charge, transfer, and separation) and casings.	Casings: Water Wires: Dry Cloth
(4)	QL, Erase Lamp	Dry cloth

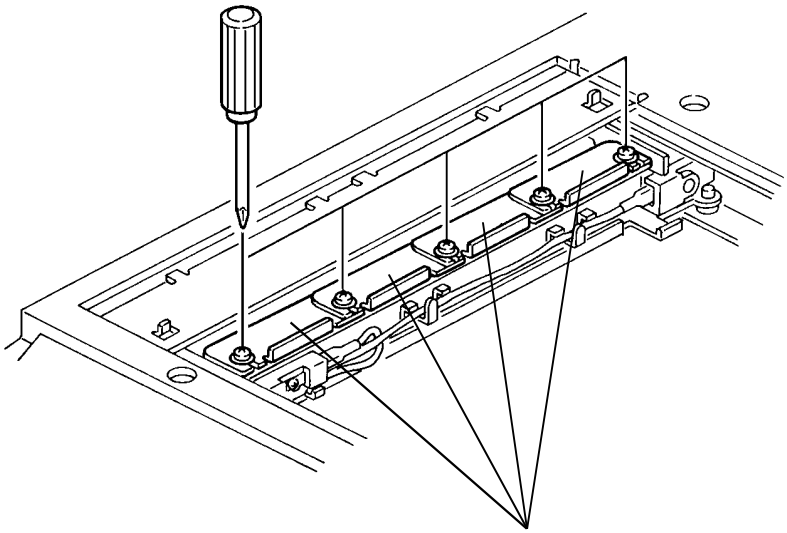
3. Clear the V_L correction by using SP95.

   NOTE: Always perform SP95 after cleaning the optics components.
4. Place the OS-A4 test chart on the exposure glass and make a full size copy at manual image density level 4 (center).

   NOTE: Make sure that the value of SP37 is set to "0" (standard value).
5. Confirm that level 2 (E0.2) of the gray scale is slightly visible on the copy. If the image density is not correct, proceed to the following steps.
6. Enter the lamp voltage setting mode using the numeral keys (SP48).
7. Change the data with the numeral keys as follows:
   If the image density is too dark: Increase the data number
   If the image density is too light: Decrease the data number
8. Confirm that the image density is within the adjustment standard.
9. Perform the ADS adjustment. (See ADS Adjustment.)

8.2 SIDE-TO-SIDE EXPOSURE ADJUSTMENT

When:	The exposure is uneven side-to-side.
Purpose:	To maintain even exposure.
Adjustment Standard:	The side-to-side variation of the gray scales on the test chart should be less than one level.
How to Adjust:	Move the exposure adjustment plates.
How it works:	Changes the position of the adjustment plates to make the light intensity from the exposure lamp even across its length.



[A]

NOTE: Do not adjust the charge corona wire height to correct for uneven image density on the copy.
If the following adjustment does not clear the problem, adjust the wire height using the drum shoe. (See Charge Corona Current Adjustment.)

1. Perform the light intensity adjustment (SP48) and the ADS adjustment (SP56).
2. Place the OS-A4 test chart on the exposure glass and make a copy.
3. If the side-to-side variations of the gray scales are not within the adjustment standard, turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
4. Position the adjusting plates [A] so that the copy image meets the adjustment standard.

8.3 IMAGE BIAS VOLTAGE ADJUSTMENT

When:	1. The image is blurred even though the image density in black solid areas is acceptable. 2. Dirty background. The problem is not caused by excess toner and cannot be solved by adjusting the light intensity.
Purpose:	To improve the copy image.
How to Adjust:	SP37
How it works:	Changes the bias voltage while the image area on the drum is being developed.

Data (SP37)	0	1	2	3	4
Bias Voltage [V]	V_0	V_0 +40	V_0 +20	V_0 –20	V_0 –40
Image Density	Normal	Darkest	Darker	Lighter	Lightest

NOTE: V_0 is the standard voltage applied to the development roller.

1. Make a copy after adjusting the light intensity.
2. If the image is blurred:
   Decrease the bias voltage by one step and readjust the light intensity.

   If the background is dirty:
   Increase the bias voltage by one step and readjust the light intensity.

8.4 TONER DENSITY ADJUSTMENT

When:	The customer wants to change the overall image density of the copies.
Purpose:	To change the toner concentration inside the development unit.
How to Adjust:	SP33
How it works:	Changes the ID pattern bias voltage and either raises/lowers the toner supply threshold.

8.5 FIXED TONER SUPPLY MODE SELECTION

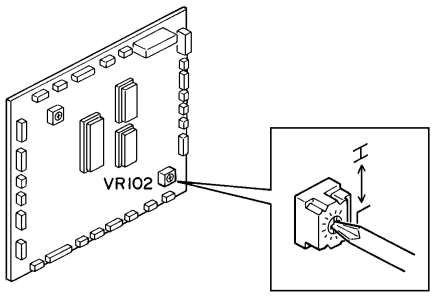
When:	A problem with the ID sensing system cannot be corrected during a service call. (Detect supply mode does not function.)
Purpose:	To switch the toner supply system from Detect mode to Fixed mode.
How to Adjust:	SP30
How it works:	Turns on the toner supply clutch every copy cycle by selecting "1" in SP30.

8.6 TONER SUPPLY RATIO SELECTION

When:	The factory setting for the toner supply amount is not appropriate for the type of original in use.
Purpose:	To adjust the toner supply amount.
Adjustment Standard:	Detect Mode : 15% (Factory Setting) Fixed Mode : 7% (Factory Setting)
How to Adjust:	Detect Mode : SP31 Fixed Mode : SP32
How it works:	Changes the interval that the toner supply clutch is on.

8.7 ID SENSOR (Vsg) ADJUSTMENT

When:	1. Check Vsg at every call, and adjust Vsg if it is out of the adjustment standard. 2. At replacement of the following parts: • ID sensor • Main board • Drum 3. A toner supply problem occurs.
Purpose:	To make sure that the ID sensor works correctly.
Adjustment Standard:	Vsg = 4.0 ± 0.2 volts
How to Adjust:	SP54
How it works:	Changes the light intensity of the ID sensor LED. The Vsg voltage is displayed on the operation panel.



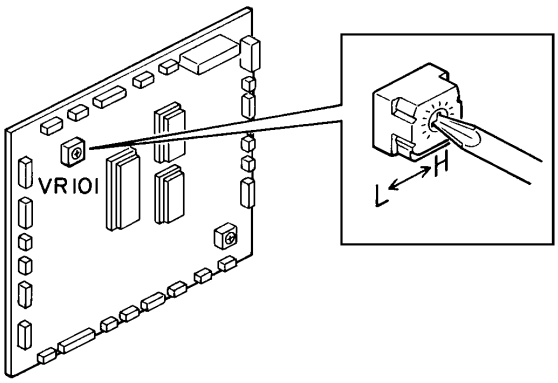
1. Turn off the main switch and clean the following parts:

Item No.	Section	Method
(1)	ID sensor	Blower brush
(2)	QL, Erase Lamp	Dry cloth

2. Reinstall all the parts.
3. Check Vsg using SP54. Adjust Vsg by turning VR102 (main board) if Vsg is out of the adjustment standard.

8.8 ADS (Auto Image Density Sensor) ADJUSTMENT

When:	1. After light intensity adjustment 2. ADS voltage is not within the adjustment standard.
Purpose:	To maintain correct ADS mode operation.
Adjustment Standard:	ADS Reference Voltage = 2.5 ± 0.1 volts
How to Adjust:	SP56
How it works:	Changes the main board ADS output voltage. The voltage reading is displayed on the operation panel.

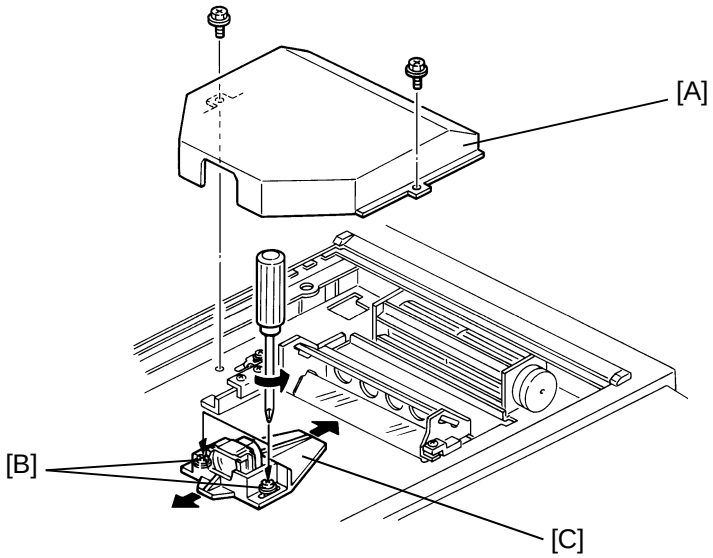


1. Place five sheets of A3 (11" x 17") paper on the exposure glass.
2. Select SP56 and press the Start key.
3. If the voltage is not within the adjustment standard, adjust it by turning VR101 on the main board.

8.9 HORIZONTAL MAGNIFICATION ADJUSTMENT

When:	The horizontal magnification is not within the adjustment standard. After loosening the first scanner wire clamps.
Purpose:	To maintain proper horizontal magnification.
Adjustment Standard:	Less than ± 0.5% difference between original and copy.
How to Adjust:	• FT3013 copier - Loosen the two screws and move the lens position • FT3213 copier - SP44 (0.2%/step, 51 steps)
How it works:	Changes the lens home position.

– FT3013 copier –



1. Place a 150 mm scale parallel to the left scale on the exposure glass.
2. Make three copies to check the horizontal magnification.
3. Confirm that the scanner wire clamps are positioned correctly using the scanner positioning pins. (See Scanner Wire Installation.)
4. Remove the lens cover [A] (2 screws).
5. Loosen screws [B] and move the lens [C] to adjust the magnification.

– FT3213 copier –

1. Change the value of SP44 to 8 (default value).
2. Confirm that the scanner wire clamps are positioned correctly using the scanner positioning pins. (See Scanner Wire Installation.)
3. Place a 150 mm scale parallel to the left scale on the exposure glass.
4. Adjust the horizontal magnification using SP44. Make three copies to check the magnification.

8.10 VERTICAL MAGNIFICATION ADJUSTMENT

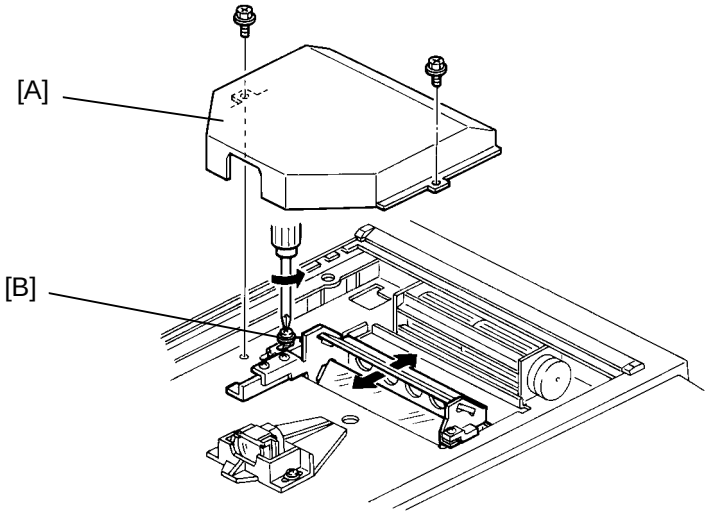
When:	The vertical magnification is not within the adjustment standard.
Purpose:	To maintain proper vertical magnification.
Adjustment Standard:	Less than ± 1.0% difference between original and copy.
How to Adjust:	SP43 (0.2%/step, 16 steps)
How it works:	Changes the scanner speed compensation.

1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the vertical magnification using SP43. Make three copies to check the magnification.

8.11 FOCUS ADJUSTMENT

When:	The copy image is out of focus. After adjusting the horizontal magnification.
Purpose:	To maintain proper focus.
Adjustment Standard:	Copy image in focus.
How to Adjust:	1. Loosen a screw and move the 4th/5th mirror assembly position ... FT3013 copier 2. SP47 (101 steps) ... FT3213 copier
How it works:	Adjusts the 4th/5th mirror assembly home position, changing the distance between the original and the drum surface.

– FT3013 copier –



1. Make three copies with the test chart to check the focus.
2. Turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
3. Remove the lens cover [A] (2 screws).
4. Loosen a screw [B] and move the 4th/5th mirror assembly to adjust the focus.

– FT3213 copier –

1. Make three copies with the test chart.
2. Adjust the focus using SP47. Check the text on the copies.

8.12 LEADING EDGE ERASE MARGIN ADJUSTMENT

When:	The leading edge erase margin is not within the adjustment standard.
Purpose:	To maintain the correct leading erase margin.
Adjustment Standard:	2.5 ± 1.5 mm (0.1 ± 0.06")
How to Adjust:	SP41 (0.4 mm/step, 16 steps)
How it works:	Changes the erase lamp on period.

1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the leading edge erase margin using SP41. Make three copies and check the erase margin.

8.13 REGISTRATION ADJUSTMENT

When:	Registration is not within the adjustment standard.
Purpose:	To maintain proper registration.
Adjustment Standard:	0 ± 2 mm (0 ± 0.08")
How to Adjust:	SP42 (0.4 mm/step, 16 steps)
How it works:	Changes the registration roller start timing.

1. Place a 150 mm scale perpendicular to the left scale on the exposure glass.
2. Adjust the registration using SP42. Make three copies and check the registration.

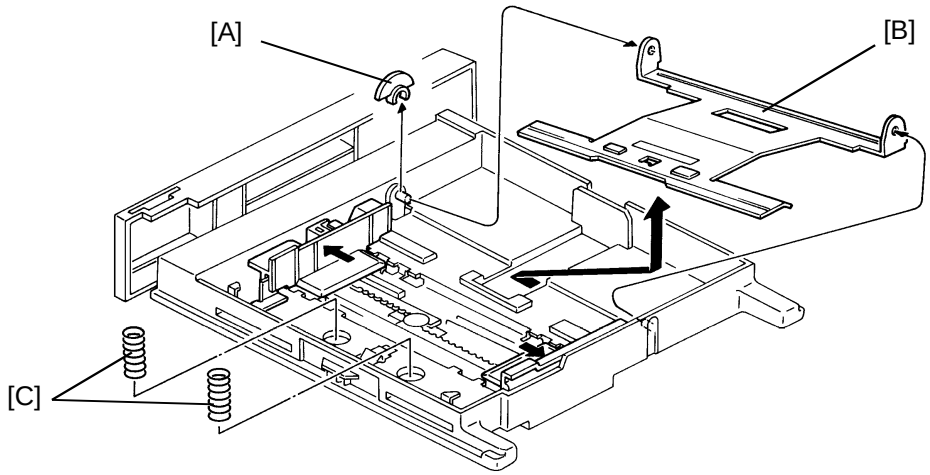
8.14 SIDE-TO-SIDE REGISTRATION ADJUSTMENT

When:	Side-to-side registration is out of the adjustment standard.
Purpose:	To maintain the proper side-to-side registration
Adjustment Standard:	0 ± 2 mm (0 ± 0.08")
How to Adjust:	1. Change the lens position. 2. Change the side fence position in the paper tray.
How it works:	Shifts the copy image.

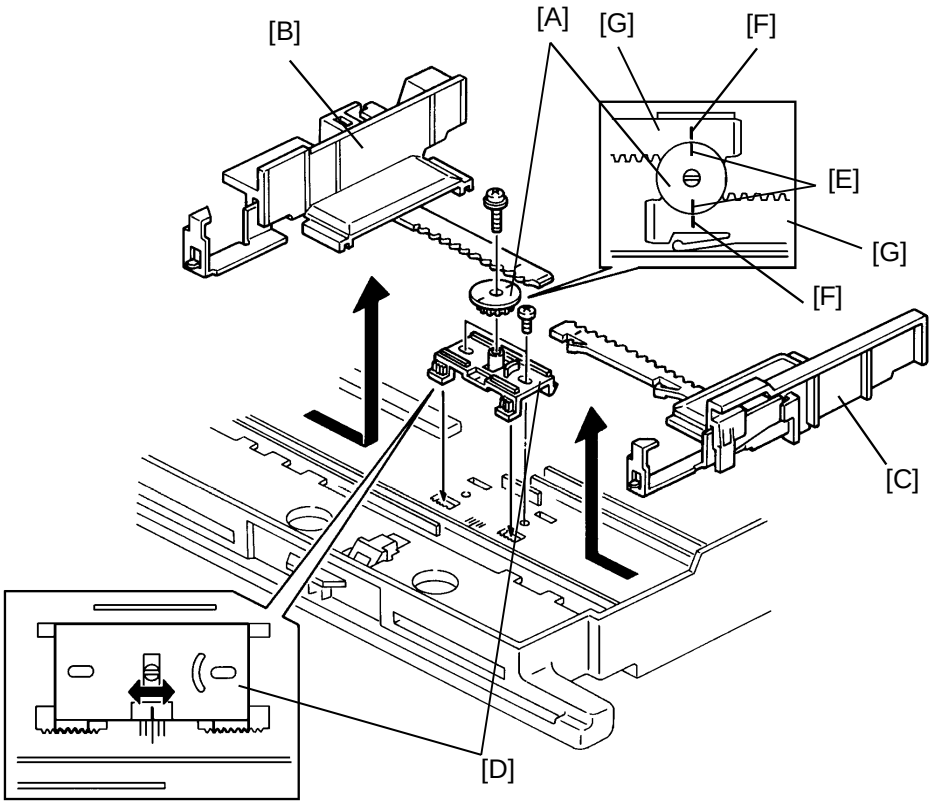
NOTE: a) When side-to-side registration is out of the adjustment standard only for the paper tray, adjust the side fence position in the paper tray.

b) When side-to-side registration is out of the adjustment standard for both the paper tray and the by-pass feed table, adjust the lens position. Check the adjustment by making a copy from the by-pass feed table. Then, make a copy from the paper tray and adjust the side fence position in the paper tray if necessary.

– Side Fence Adjustment (Paper Tray) –



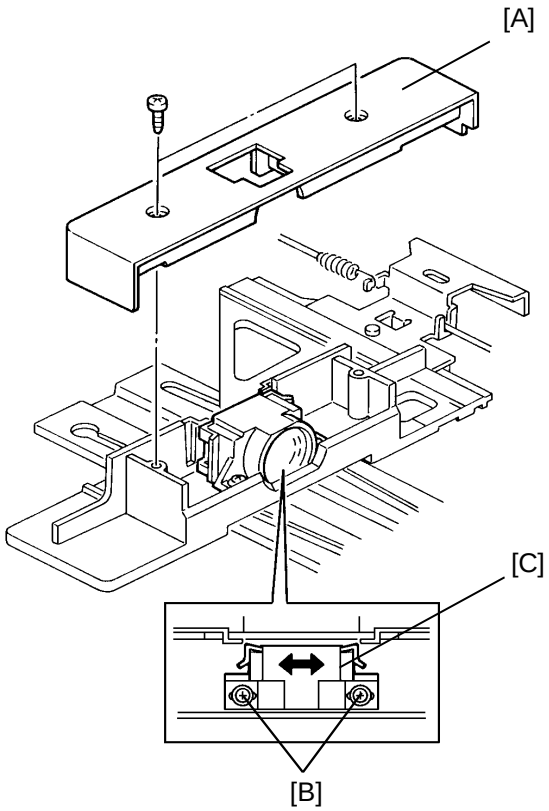
1. Pull the paper tray out.
2. Move the side fences to the widest position.
3. Remove the bottom plate spacer [A].
4. Slide the bottom plate [B] to the front side and remove it.
5. Remove two springs [C].



6. Remove the pinion gear [A] (1 screw).
7. Remove the front [B] and rear [C] side fences.
8. Remove the registration adjustment plate [D] (2 screws) and set it in the desired position.

   NOTE: When reinstalling the pinion gear [A], the lines [E] on the gear must fit the lines [F] of the rack gears [G].

– Lens Position Adjustment –

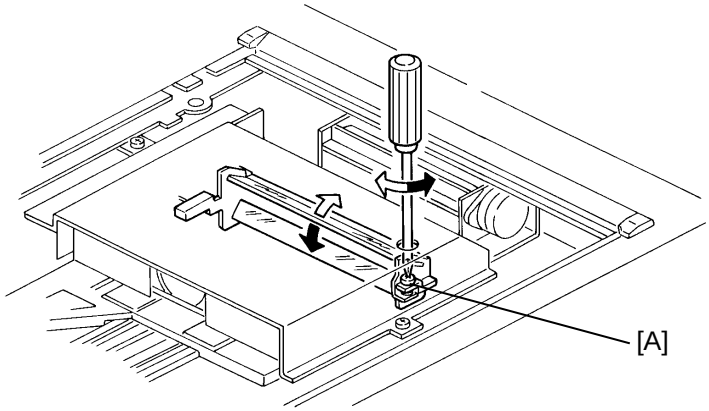


1. Turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
2. Remove the lens cover (2 screws) and lens housing cover (FT3213 copier only) [A] (2 screws).
3. Loosen two screws [B] and shift the lens [C] to adjust the side-to-side registration.

8.15 4TH/5TH MIRROR HEIGHT ADJUSTMENT

When:	Parallelogram (skewed) image appears.
Purpose:	To maintain the proper copy image.
How to Adjust:	Turn the 4th/5th mirror height adjustment screw.
How it works:	Changes the 4th/5th mirror height.

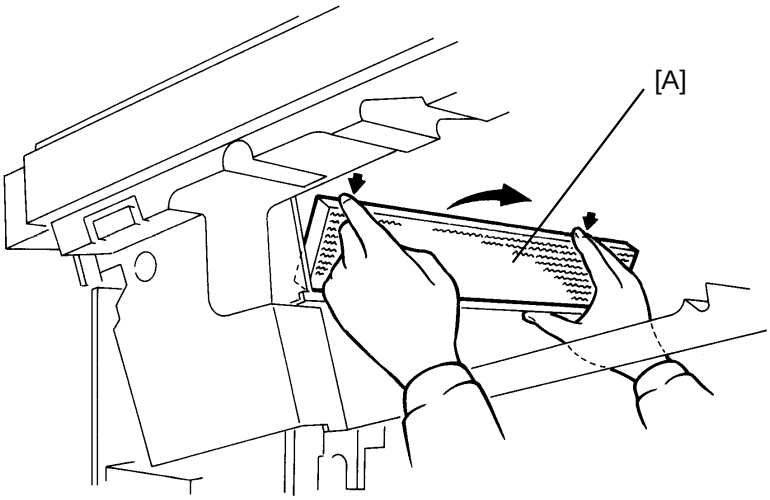
CAUTION: Never perform this adjustment until you have positively verified that the source of the skewing is optical and not in the paper path.



1. Turn off the main switch and remove the exposure glass. (See Exposure Glass Removal.)
2. Adjust the 4th/5th mirror height by turning the screw [A]. Refer to the arrows in the illustration.

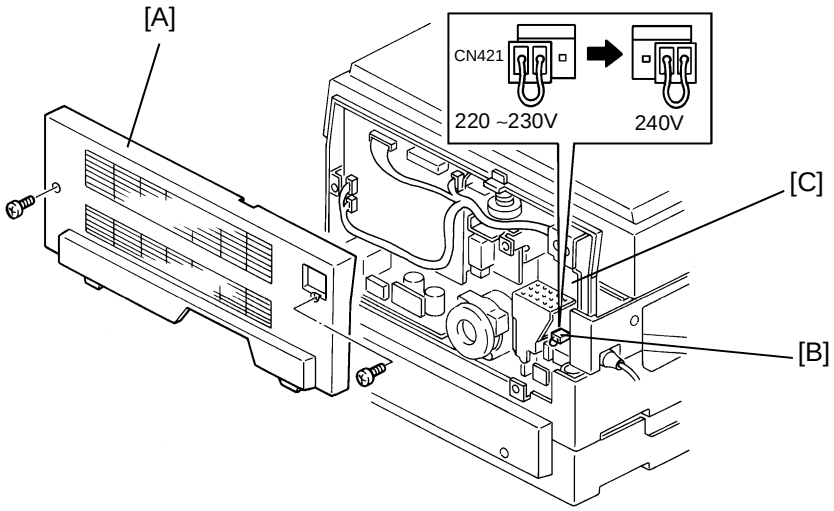
9. OTHERS

9.1 OZONE FILTER REPLACEMENT



1. Open the front cover.
2. Remove the cleaning unit. (See Cleaning Unit Removal.)
3. Hold down the top of the upper unit and open the upper unit by pushing the release lever.
4. Pinch down at the top of the filter at both ends and remove the ozone filter [A] as shown.

9.2 220~230/240V CONVERSION

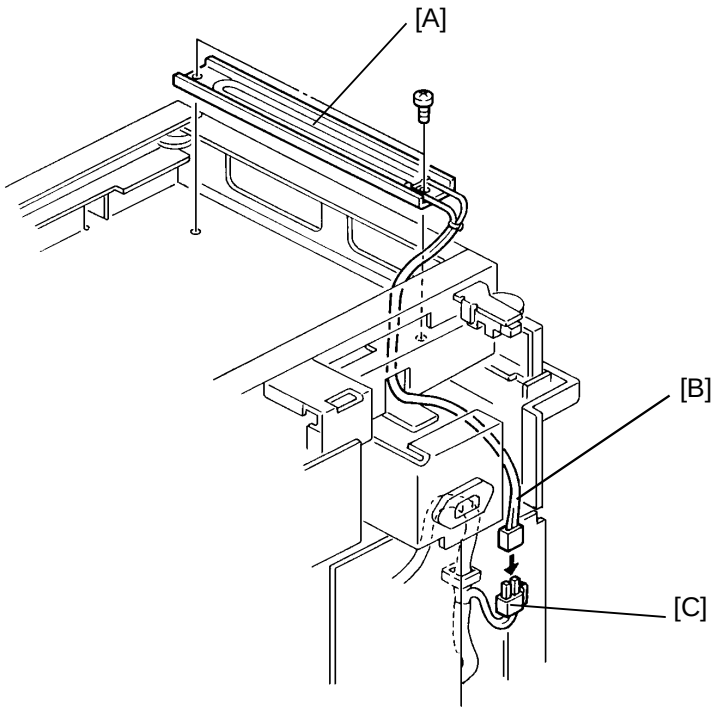


1. Remove the upper rear cover [A] (2 screws).
2. Disconnect the short connector [B] (2P/White) on the ac drive board [C] from CN421 and reconnect it to CN421 as shown in the illustration.
3. Reinstall the upper rear cover.
4. Plug in the machine and turn on the main switch, then lower the platen cover.
5. Enter the SP mode as follows:
   a) Enter "71" using the numeral keys.
   b) Press and hold the Clear/Stop key until a dot (•) appears in the top left corner of the copy counter.
   c) Release the Clear/Stop key and again press the Clear/Stop key.
   d) Press the Lighter key.
6. Perform SP 12 using the following sequence:

SP Mode Number		Procedure
12	Conversion from 220 – 230V to 240V.	Enter "12" using the numeral keys. Then, press the Auto Image Density key. Change the setting from "0" to "1" using the numeral keys. Then, press the Auto Image Density key. "12" will start blinking. Turn the main switch off and on to exit the SP mode.

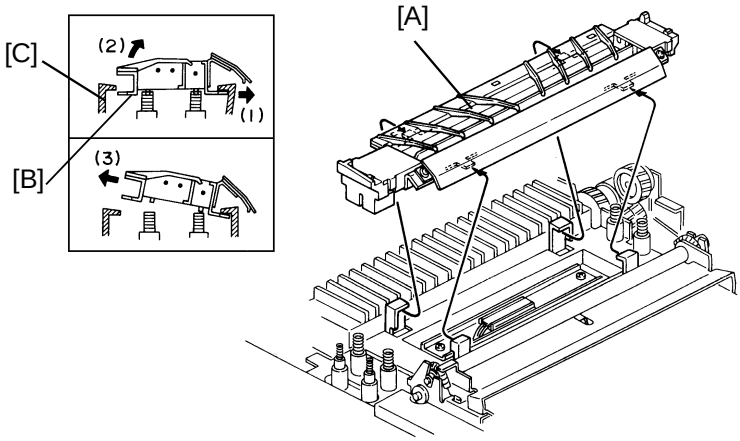
9.3 OPTIONAL EQUIPMENT INSTALLATION

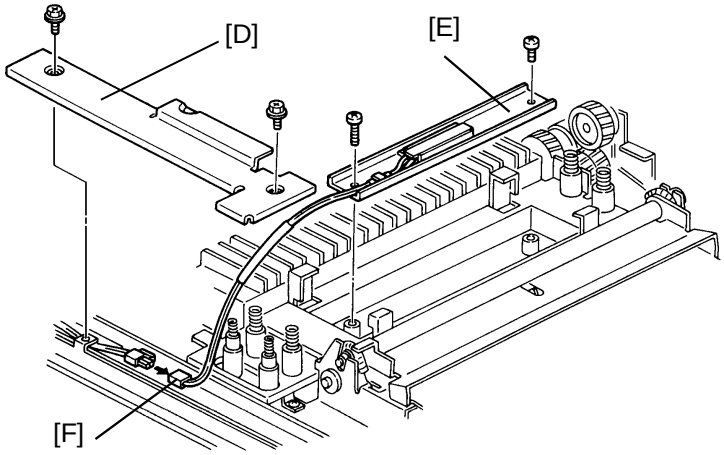
9.3.1 Optics Anti-condensation Heater Installation



1. Turn off the main switch.
2. Remove the upper rear cover (2 screws).
3. Remove the exposure glass. (See Exposure Glass Removal.)
4. Install the optics heater [A] in the optics cavity as shown (2 screws).
5. Wire the heater harness [B] and connect the connector [C] as shown.

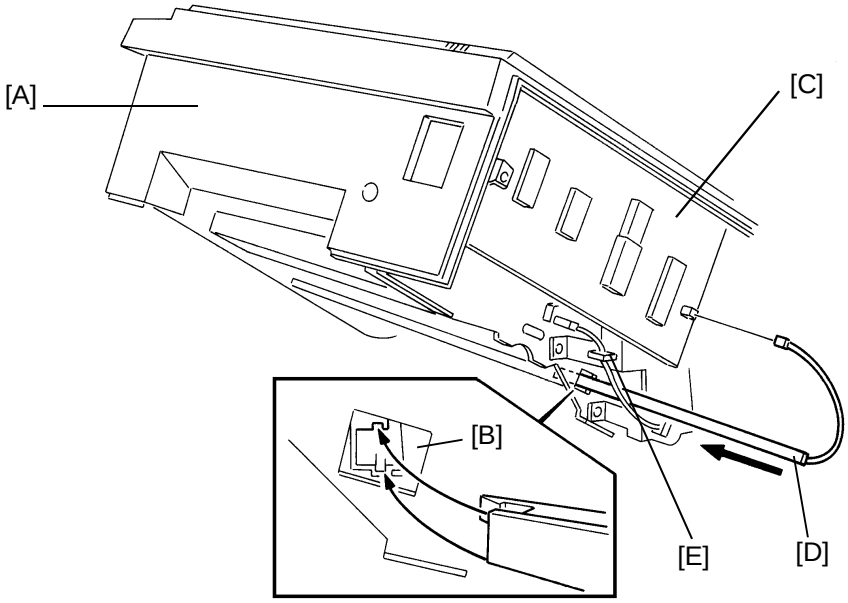
9.3.2 Drum Anti-condensation Heater Installation





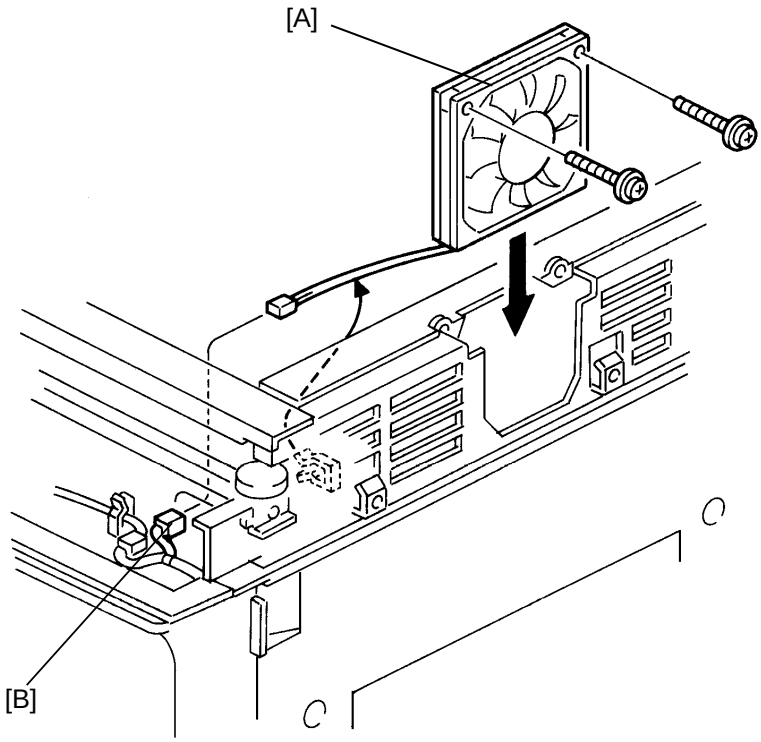
1. Open the front cover.
2. Open the upper unit by pushing the release lever.
3. Pull the transfer/separation (TC/SC) corona unit [A] toward the registration roller side (1) and release the left positioning tabs [B] of the TC/SC corona unit from the holders [C] of the transport unit (2). Then take out the TC/SC corona unit (3).
4. Remove the harness cover [D] (2 screws).
5. Install the anti-condensation heater [E] (2 screws) and connect the heater connector [F].

9.3.3 Pre-transfer Lamp (PTL) Installation



1. Remove the upper rear cover (2 screws).
2. Open the front cover.
3. Hold down the top of the upper unit and open the upper unit [A] by pushing the release lever.
4. Locate the pre-transfer lamp opening [B] below the main board [C] and gently insert the PTL [D] as shown.
5. Connect the 2P connector of the PTL to CN111 on the main board (1 harness clamp [E]).

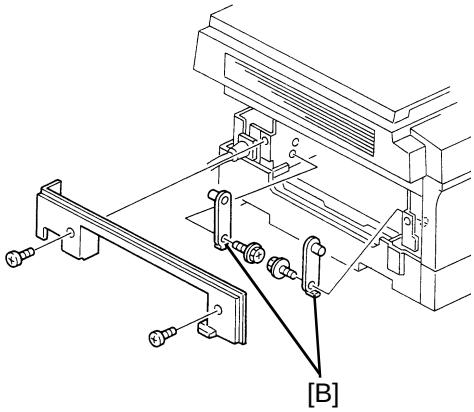
9.3.4 Optics Cooling Fan Installation (FT3013 Copier Only)



1. Remove the upper cover. (See Upper Cover Removal.)
2. By checking the arrow printed on the optics cooling fan [A], install the fan so that air flows into the optics cavity (2 screws).
3. Locate the 2P connector [B] under the front scanner guide rail and connect it to the fan harness as shown.
4. Reinstall all the parts and turn on the machine.
5. Access SP91 and confirm that "1" (fan mode) is selected . If not, enter "1" and exit the SP mode.

9.4 UPPER UNIT TORSION SPRING ADJUSTMENT

1. Make sure that the main switch is turned off and the power supply cord is unplugged.
2. Remove the platen cover or DF.
3. Open the front cover.
4. Remove the following covers and units.
    - Development Unit
    - Upper rear cover
    - Upper left [A

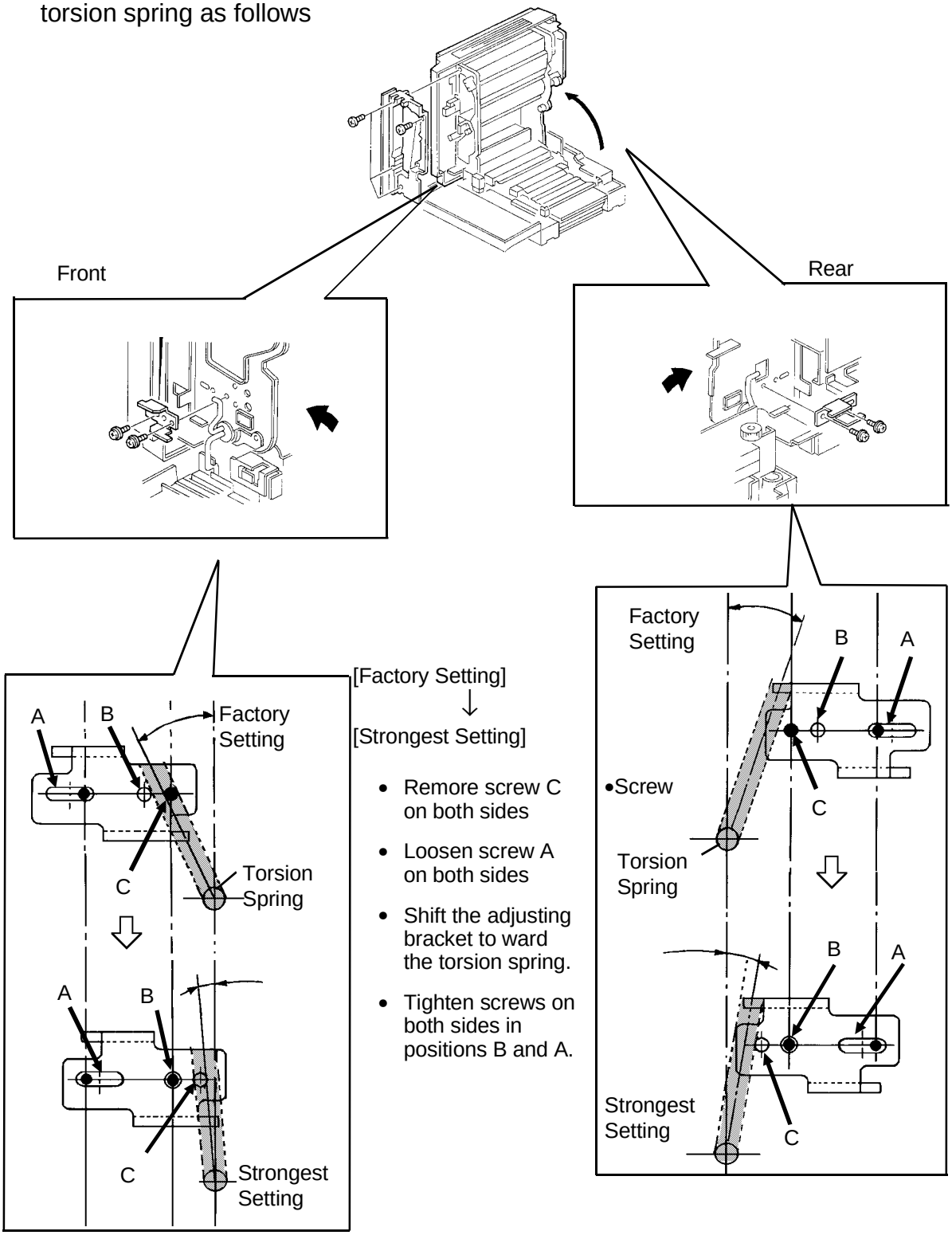


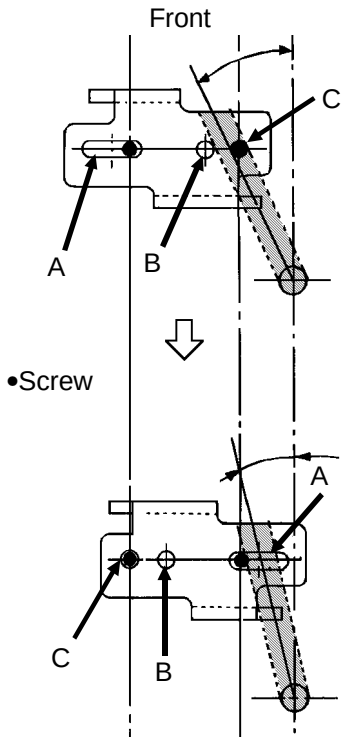
5. Remove the front and rear upper unit stoppers [B] (1 screw).

6. Open the upper unit gently while holding it until the upper unit stops at the 90 position as shown.

7. Remove the inner cover [D] (2 screws).

8. Adjust the force of the torsion spring as follows





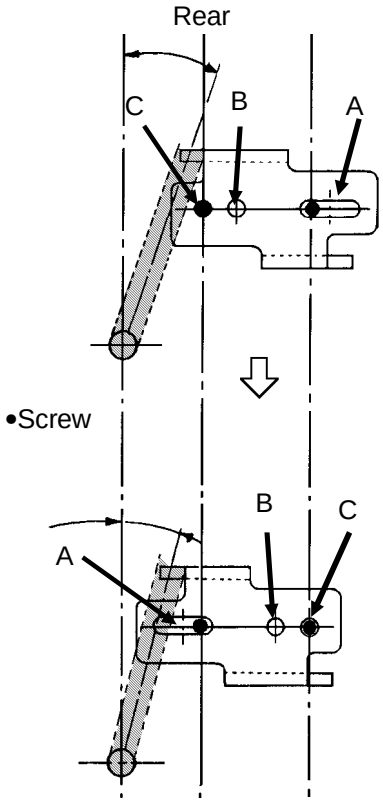
[Factory Setting]

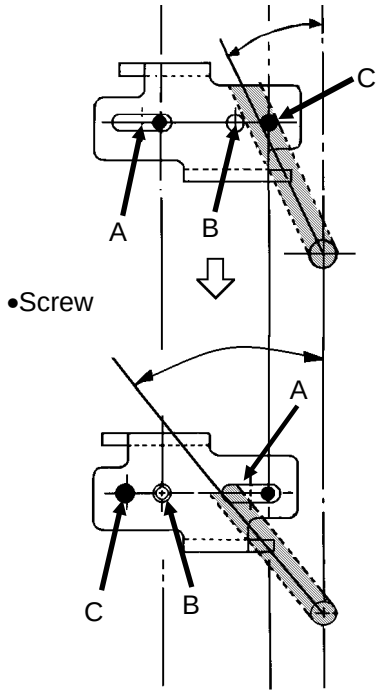
↓

[Strongest Setting]

Remove the adjusting bracket (2 screws on each side)

- Rotate the bracket 180° and install it using holes A and C.



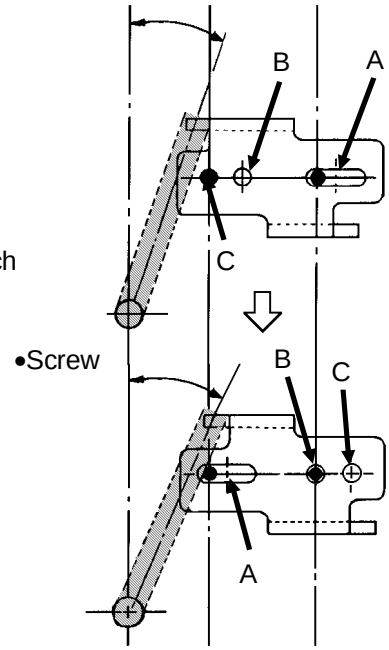


[Factory Setting]

↓

[Weak Setting]

- Remove the adjusting bracket (2 screws on each side).
- Rotate the bracket 180° and install it using holes B and A.

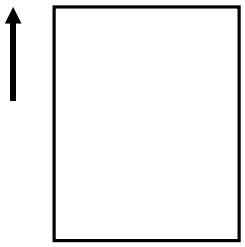


TROUBLESHOOTING

1. COPY QUALITY

1.1 BLANK COPY (WHITE COPY)

- Problem -



White or almost white copy.

- Possible Causes -

1. Charge is not applied.
   - CC/Grid/bias power pack (charge or grid) failure
   - Poor contact of power pack lead wires
   - Broken charge corona wire
   - Leak in insulator or endblock

2. Copy image is not transferred to the paper.
   - TC/SC power pack (transfer) failure
   - Poor contact of the power pack lead wires
   - Poor contact of the transfer corona wire
   - Leak in the insulator or endblocks

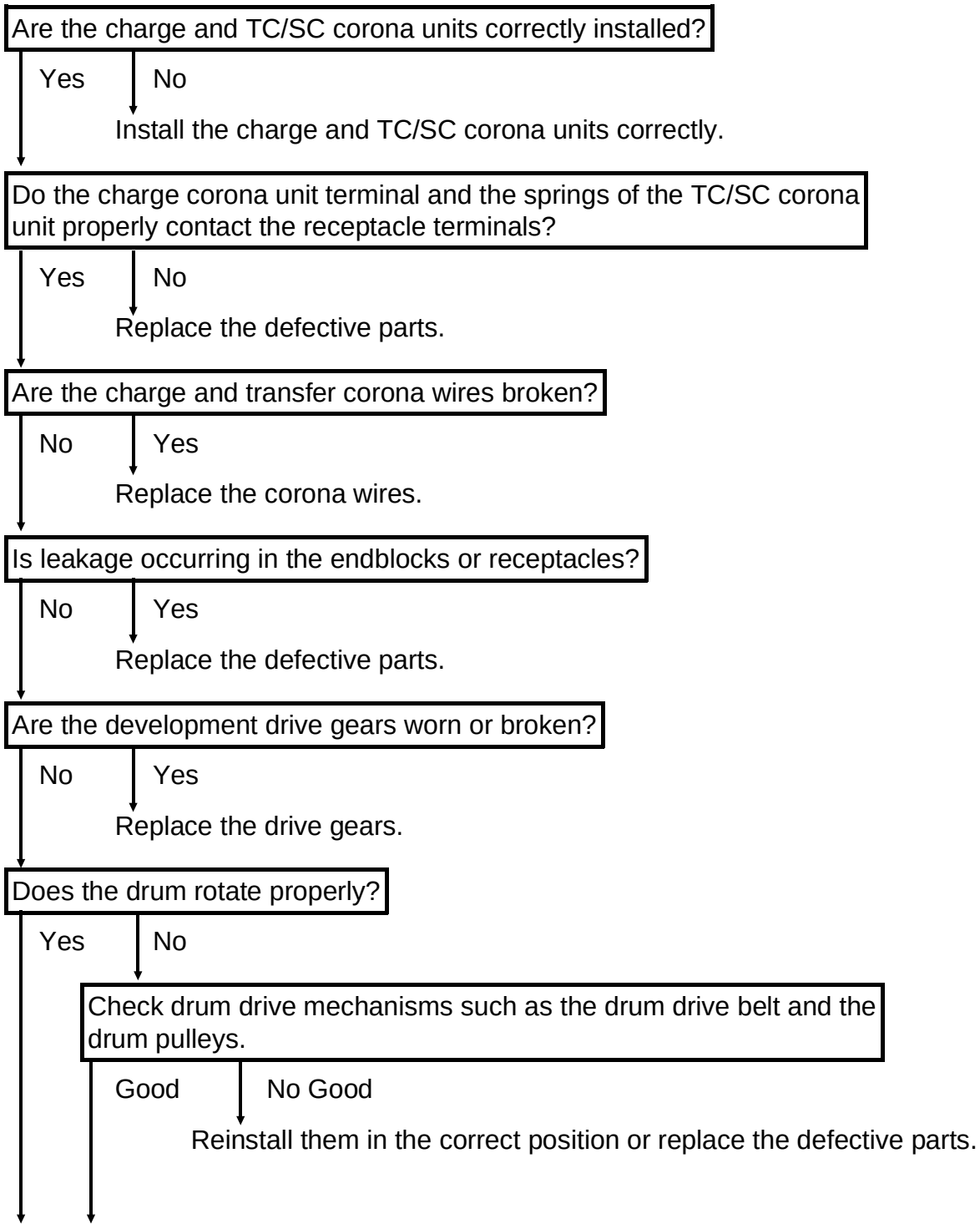
3. The development roller does not rotate.
   - Broken drive gear

4. The development roller is not properly grounded.

5. Poor drum sensitivity.
   - The drum was exposed to fluorescent light or direct sunlight for a long period of time.
   - The drum was exposed to ammonia gas or corrosive fumes for a long period of time.

6. The drum does not rotate.

- Action -


Are the charge and TC/SC corona units correctly installed?
Yes
No
Install the charge and TC/SC corona units correctly.
Do the charge corona unit terminal and the springs of the TC/SC corona unit properly contact the receptacle terminals?
Yes
No
Replace the defective parts.
Are the charge and transfer corona wires broken?
No
Yes
Replace the corona wires.
Is leakage occurring in the endblocks or receptacles?
No
Yes
Replace the defective parts.
Are the development drive gears worn or broken?
No
Yes
Replace the drive gears.
Does the drum rotate properly?
Yes
No
Check drum drive mechanisms such as the drum drive belt and the drum pulleys.
Good
No Good
Reinstall them in the correct position or replace the defective parts.

↓ ↓

Check the following points:

- CN119-5 (Charge trigger line) and CN119-3 (Grid trigger line)
  (1) If the signal stays HIGH after the Start key is pressed, replace the main board.

  (2) If the charge corona does not turn on even if the signal changes to LOW, replace the CC/Grid/Bias power pack.

- CN117-13 (Transfer trigger line)
  (1) If the signal stays HIGH after the Start key is pressed, replace the main board.

  (2) If the transfer corona does not turn on even if the signal changes to LOW, replace the TC/SC power pack.

If there is no problem with the signal lines, replace the drum if the sensitivity does not recover even when the drum is not exposed to light.

1.2 DIRTY BACKGROUND

- Problem -

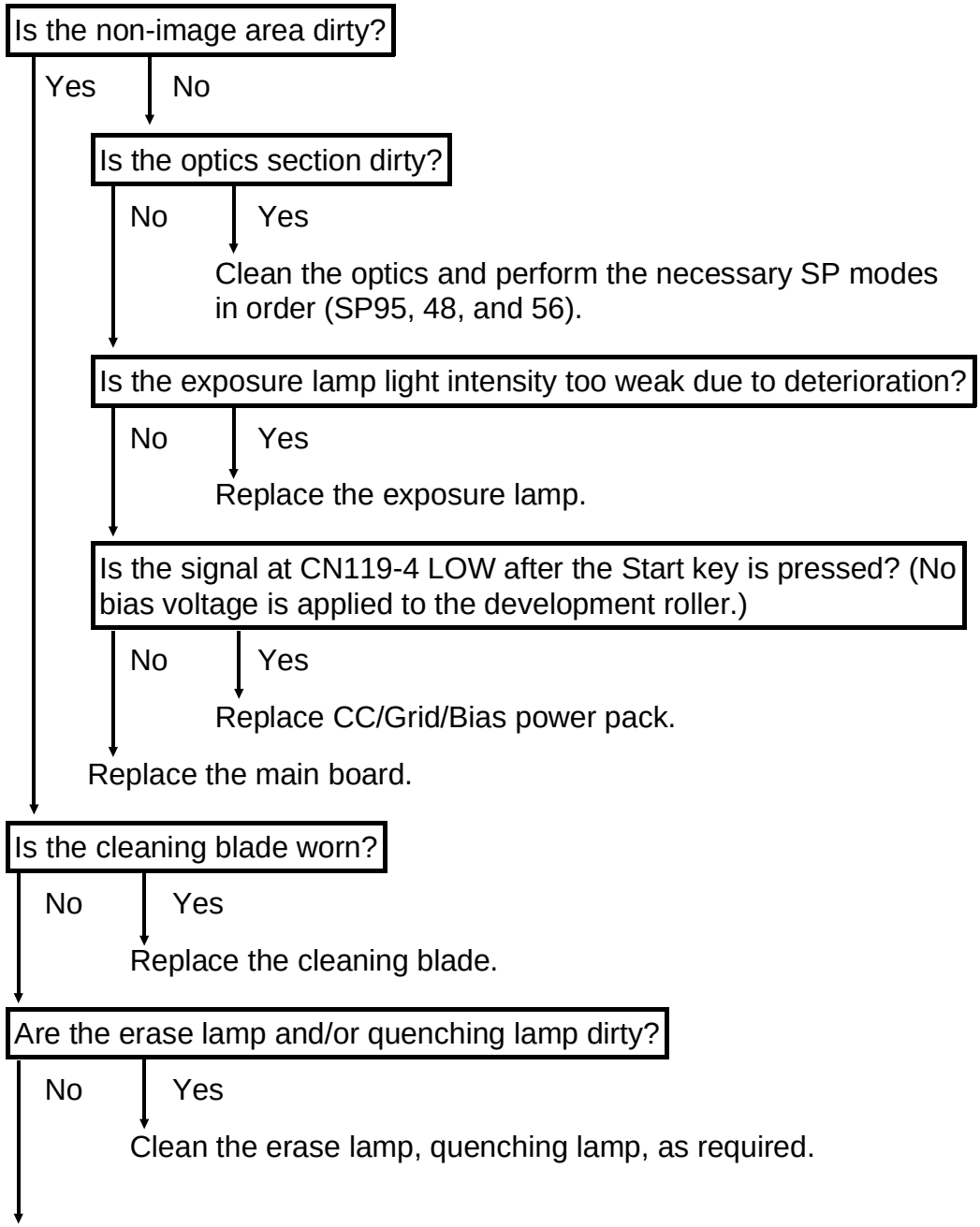
1. Dirty background at image density level 4 (manual setting).
2. When newspapers are copied, the background is dirty even at level 7.
3. ADS copies have a dirty background.

- Possible Causes -

1. Dirty optics
2. Toner scattering
   - High toner density
   - The inlet seal of the development unit is stripped off.
   - The doctor gap is too wide.
3. The exposure lamp is not bright enough. This may be caused by deterioration of the exposure lamp or low lamp voltage.
4. In ADS mode, reflected light from the original is too high.
5. The ADS optical fiber is cut or bent.
6. The development bias is grounded.

- Action -

Make a copy in reduction mode at manual image density level 4.


Is the non-image area dirty?
Yes
No
Is the optics section dirty?
No
Yes
Clean the optics and perform the necessary SP modes in order (SP95, 48, and 56).
Is the exposure lamp light intensity too weak due to deterioration?
No
Yes
Replace the exposure lamp.
Is the signal at CN119-4 LOW after the Start key is pressed? (No bias voltage is applied to the development roller.)
No
Yes
Replace CC/Grid/Bias power pack.
Replace the main board.
Is the cleaning blade worn?
No
Yes
Replace the cleaning blade.
Are the erase lamp and/or quenching lamp dirty?
No
Yes
Clean the erase lamp, quenching lamp, as required.

If toner scattering occurs, see the toner scattering section of the manual.

If dirty background occurs only in ADS mode, do the following:

- If the ADS voltage is not within ± 0.1 volts of the standard voltage (2.5 V), readjust the ADS voltage.
- If the signal at CN101-5 stays HIGH, check the harness and sensor, and replace defective parts.
- If the signal at CN101-4 stays LOW, replace the main board.

1.3 UNEVEN IMAGE DENSITY

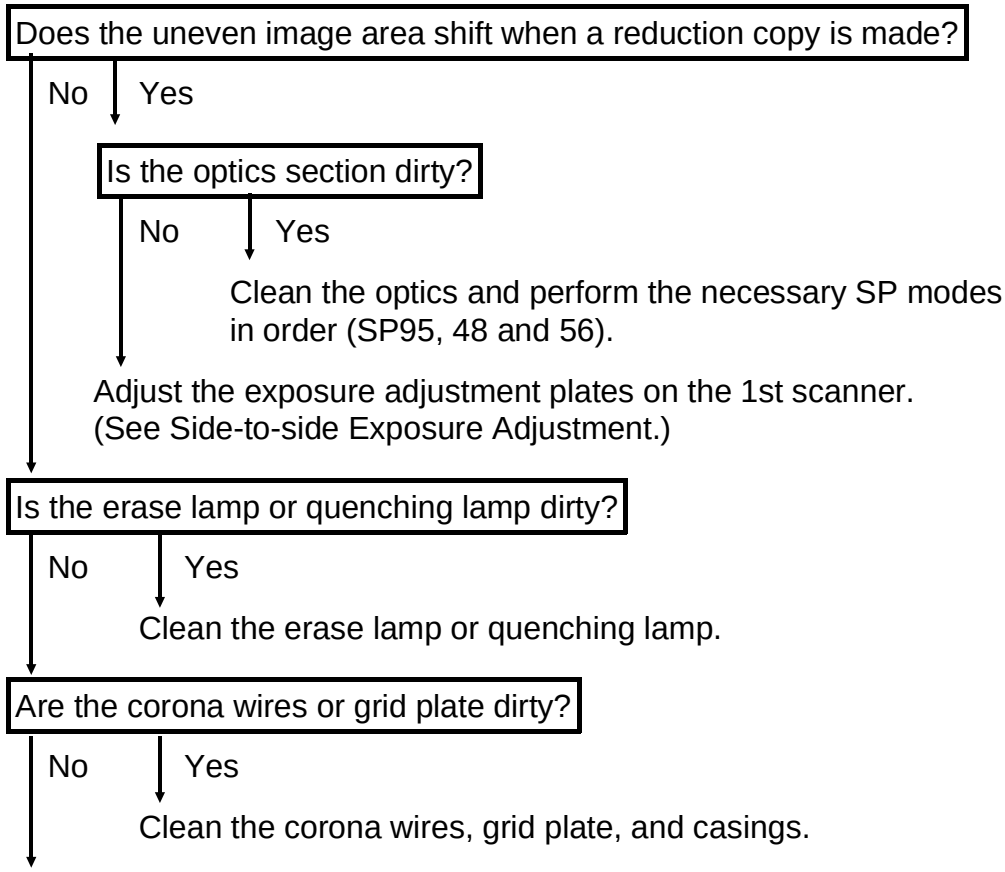
- Problem -

Uneven image density appears on the copies.

- Possible Cause -

1. Dirty optics
2. Uneven exposure adjustment plates
3. Dirty corona wires or grid
4. Uneven height of the charge corona wire

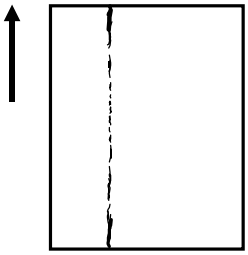
- Action -


Does the uneven image area shift when a reduction copy is made?
No
Yes
Is the optics section dirty?
No
Yes
Clean the optics and perform the necessary SP modes in order (SP95, 48 and 56).
Adjust the exposure adjustment plates on the 1st scanner. (See Side-to-side Exposure Adjustment.)
Is the erase lamp or quenching lamp dirty?
No
Yes
Clean the erase lamp or quenching lamp.
Are the corona wires or grid plate dirty?
No
Yes
Clean the corona wires, grid plate, and casings.
Adjust the charge corona wire height using a drum shoe. (See Charge Corona Current Adjustment.)

1.4 VERTICAL BLACK BANDS

- Problem -

Vertical black bands appear on the copy.



- Possible Causes -

1. Dirty optics
2. Dust between the cleaning blade and drum
3. Edge of the cleaning blade deformed
4. Deformed inlet seal on the development unit

- Action -

Do the black bands shift when a reduction copy is made?

No

Yes → Check and clean the optics section. After cleaning the optics perform the necessary SP modes in order (SP95, 48, and 56).

Press the blade release lever down two or three times to clean the edge of the cleaning blade. If black bands still appear, go to the next step.

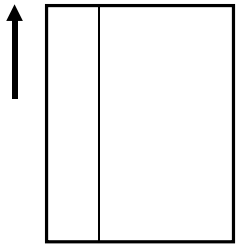
Is the edge of the cleaning blade deformed?

No

Yes → Replace the cleaning blade.

If the inlet seal on the development unit is deformed, replace the inlet seal plate and the seal as a set.

1.5 VERTICAL BLACK LINES



- Problem -

Thin black lines appear on the copy.

- Possible Causes -

1. Scratched cleaning blade
2. Dirty or scratched exposure glass or dirty or scratched mirrors
3. Scratched or dirty drum
4. Scratched hot roller

- Action -

Do the black lines shift when a reduction copy is made?

No

Yes

Clean or replace the exposure glass or mirrors. After cleaning the optics, perform the necessary SP modes in order (SP95, 48, and 56).

Is the edge of the cleaning blade scratched?

No

Yes

Replace the cleaning blade.

Is the hot roller scratched?

No

Yes

Check whether black lines appear on the copy by stopping the copy paper in the transport section. If no black lines appear, replace the hot roller.

Check whether the drum is scratched or toner is built-up on the drum.

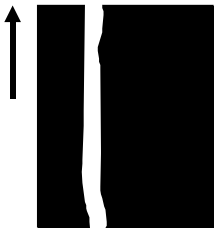
- If toner is built-up on the drum, clean the drum with a damp cloth.
- If the drum is scratched, replace the drum.

NOTE: When replacing the drum, perform drum initial setting using SP66.

1.6 VERTICAL WHITE LINES OR BANDS—1 (DULL OR BLURRED)

- Problem -

Dull or blurred white lines appear on the copy.



- Possible Causes -

1. Dirty or deteriorated charge corona wire
2. Dirty or deformed grid plate
3. Damp or deformed inlet seal on the development unit

- Action -

Are the charge corona wires or grid plate dirty?

No

Yes

Clean the charge corona wires or grid plate.

Is the inlet seal damp or deformed.

No

Yes

Clean the inlet seal with a dry cloth. If the problem is not corrected, replace the inlet seal plate and the seal as a set.

Is the grid plate deformed?

No

Yes

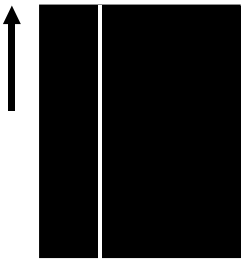
Replace the grid plate.

Replace the charge corona wire.

1.7 VERTICAL WHITE LINES OR BANDS—2 (THIN, DISTINCT)

- Problem -

Vertical white lines appear on the copy.



- Possible Causes -

1. Paper dust on the edge of the cleaning blade
2. Scratched drum
3. Scratched hot roller

- Action -

Press the cleaning blade release lever down several times. Make a copy and if white lines still appear, go to the next step.

↓

Make a copy and stop the machine when the paper reaches the transport section. Do white lines appear on the copy?

No ↓

Replace the hot roller if it is scratched.

Yes ↓

Replace the drum if it is scratched.

NOTE: If the drum is scratched, find out what caused the scratches on the drum and correct the problem.

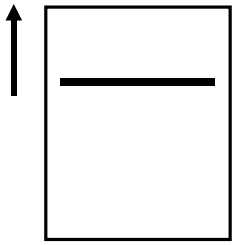
- Paper misfeed
- Incorrect positioning of the pick-off pawls
- Foreign substances on the cleaning blade
- Carrier leakage

When replacing the drum, perform the drum initial setting using SP66.

1.8 HORIZONTAL BLACK/WHITE LINES

- Problem -

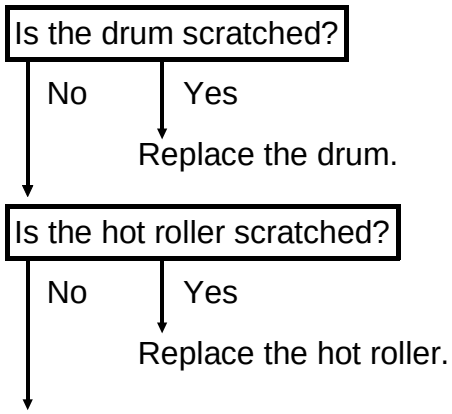
Black or white lines perpendicular to the paper feed direction appear on the copy image.



- Possible Causes -

1. Drum is scratched.
   If black lines appear at 251 mm intervals, the cause is a scratched drum or toner build up.
2. Hot roller is scratched.
   If black lines appear at 91 mm intervals, the cause is a scratched hot roller.
3. Toner adheres to the drum surface.
   Due to insufficient cleaning, foreign matter may accumulate on the blade, causing toner to stick to the drum surface when the drum stops.

- Action -



If toner adheres to the drum surface, clean the drum with water. Also clean or replace the cleaning blade.

1.9 JITTER

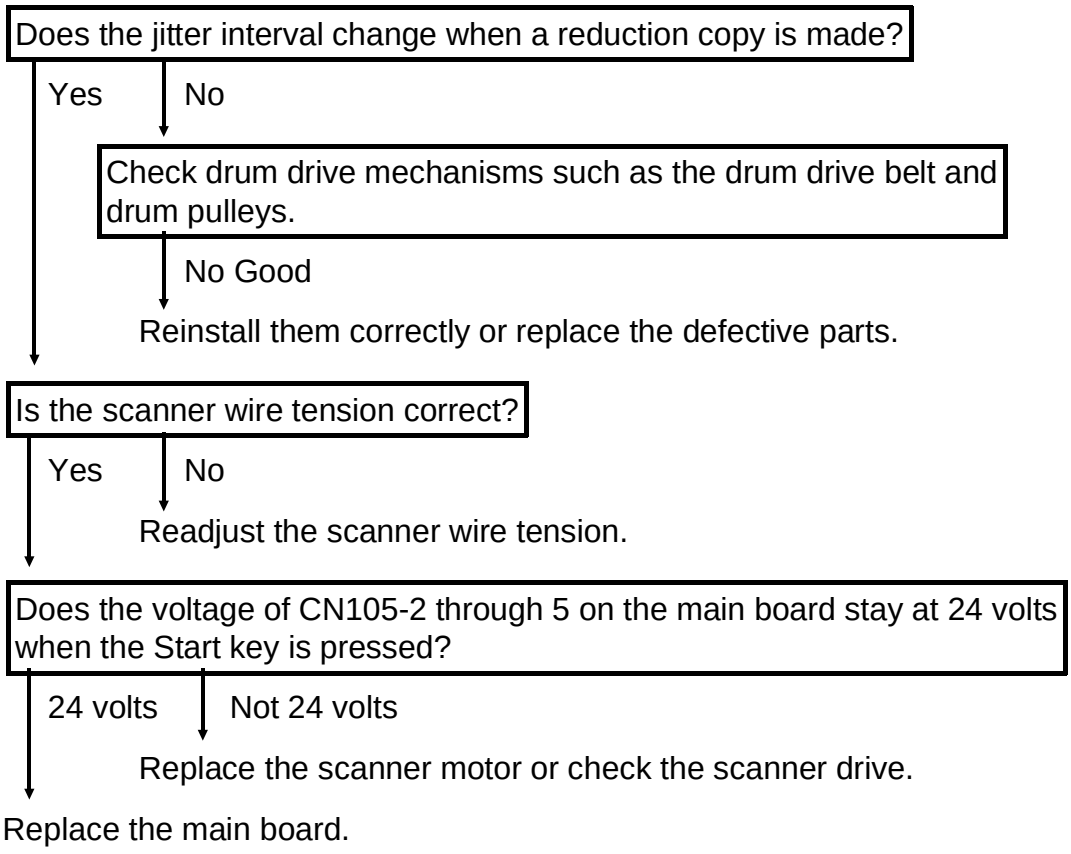
- Problem -

Jitter appears on the copy.

- Possible Causes -

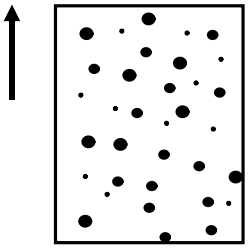
1. Drum not turning smoothly
2. Scanner not moving smoothly

- Action -


Does the jitter interval change when a reduction copy is made?
Yes
No
Check drum drive mechanisms such as the drum drive belt and drum pulleys.
No Good
Reinstall them correctly or replace the defective parts.
Is the scanner wire tension correct?
Yes
No
Readjust the scanner wire tension.
Does the voltage of CN105-2 through 5 on the main board stay at 24 volts when the Start key is pressed?
24 volts
Not 24 volts
Replace the scanner motor or check the scanner drive.
Replace the main board.

1.10 BLACK SPOTS ON THE COPY IMAGE

- Problem -



The grid voltage is not applied correctly.

- Poor contact between the charge corona casing and grid plate
- CC/G/B power pack defective
- Main board defective

- Action -

Is there good electrical contact between the charge corona casing and the grid plate?

Yes

No

Repair the poor contact and replace any parts if needed.

Check the voltage at CN119-1 on the main board.

0 volts

Not 0 volts

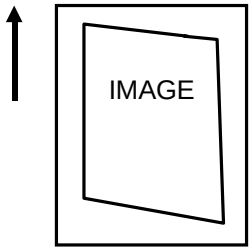
Replace the main board.

Replace the CC/G/B power pack.

1.11 SKEWED (OPTICAL) COPY IMAGE

- Problem -

The copy image is skewed (parallelogram shape).



The sides of the copy image are straight, but the leading and trailing edges are skewed.
(This differs from skewing originating in the paper path.)

- Possible Causes -

1. 4th/5th mirror assembly is not parallel with the 1st and 2nd scanners.
2. Mirrors are in the wrong position.
3. The stubs of the 4th/5th mirror assembly are off the rails.

- Action -

Is each mirror positioned correctly on its scanner and on the 4th/5th mirror assembly?

Yes

No → Reposition the mirror correctly. If the spring plates are defective, replace them.

Are the stubs of the 4th/5th mirror assembly off the rails?

No

Yes → Put the mirror assembly stubs back on the rails.

Readjust the height of 4th/5th mirror assembly by turning the adjusting screw.

1.12 TONER DENSITY TOO HIGH

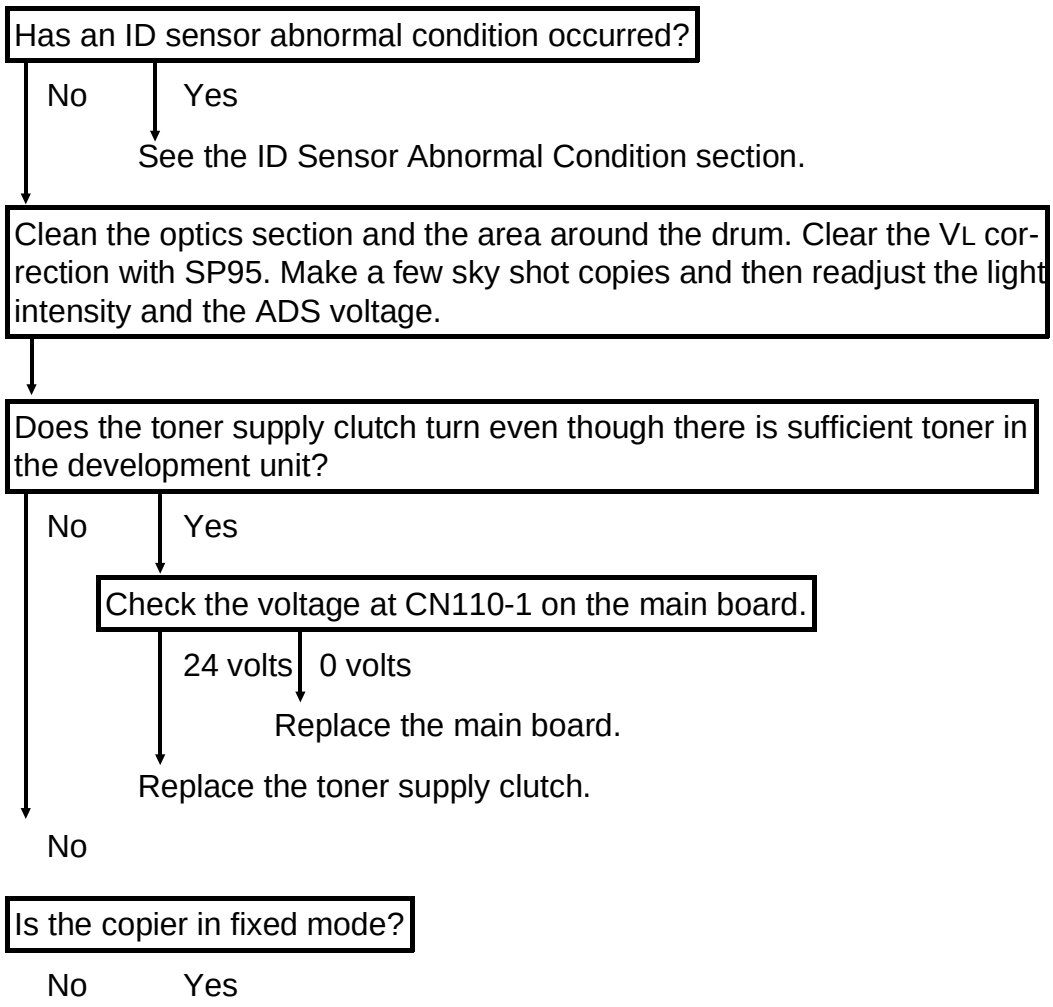
- Problem -

1. Dirty background appears on the copy.
2. The image density of black solid areas is too high.
3. Toner has built up on the endblock covers of the TC/SC corona unit and also on the upper cover of the development unit.

- Possible Causes -

1. The light intensity of the exposure lamp is too high.
2. The toner supply clutch keeps on turning continuously.
3. The copier is in fixed toner supply mode.
4. The main board is defective.
5. The ID sensor bias voltage (modules) is too low.
6. The charge corona current is too low.
7. The ID sensor grid voltage is too low.

- Action -


Has an ID sensor abnormal condition occurred?
No
Yes
See the ID Sensor Abnormal Condition section.
Clean the optics section and the area around the drum. Clear the VL correction with SP95. Make a few sky shot copies and then readjust the light intensity and the ADS voltage.
Does the toner supply clutch turn even though there is sufficient toner in the development unit?
No
Yes
Check the voltage at CN110-1 on the main board.
24 volts
0 volts
Replace the main board.
Replace the toner supply clutch.
No
Is the copier in fixed mode?
No
Yes

Change the value of SP30 from "1" to "0".

Is the charge corona current correct?

Yes

No

Readjust the charge corona current.

Is the grid voltage correct?

Yes

No

Readjust the grid voltage.

Check SP33. If the setting is greater than "2", reset the value to "0".

1.13 TONER DENSITY TOO LOW

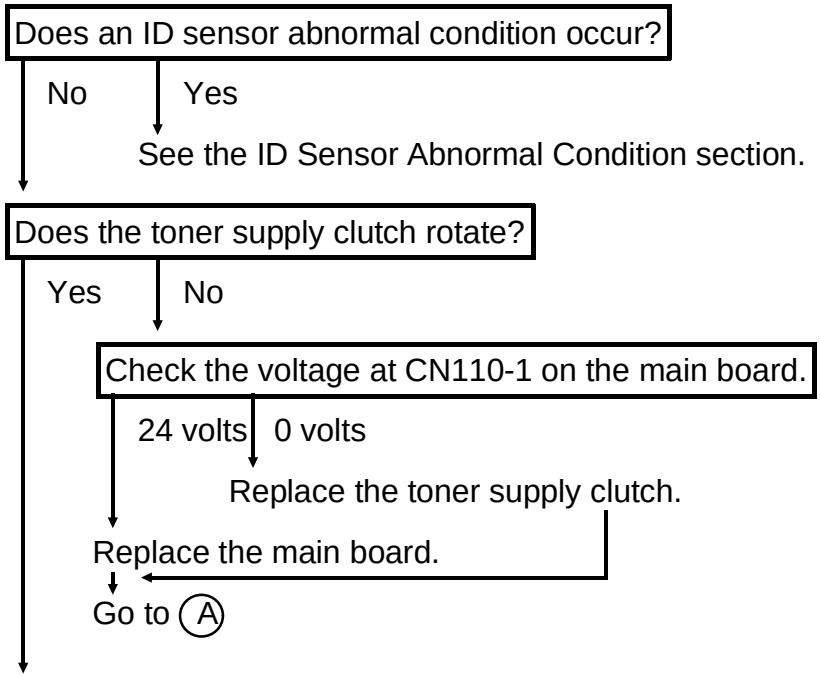
- Problem -

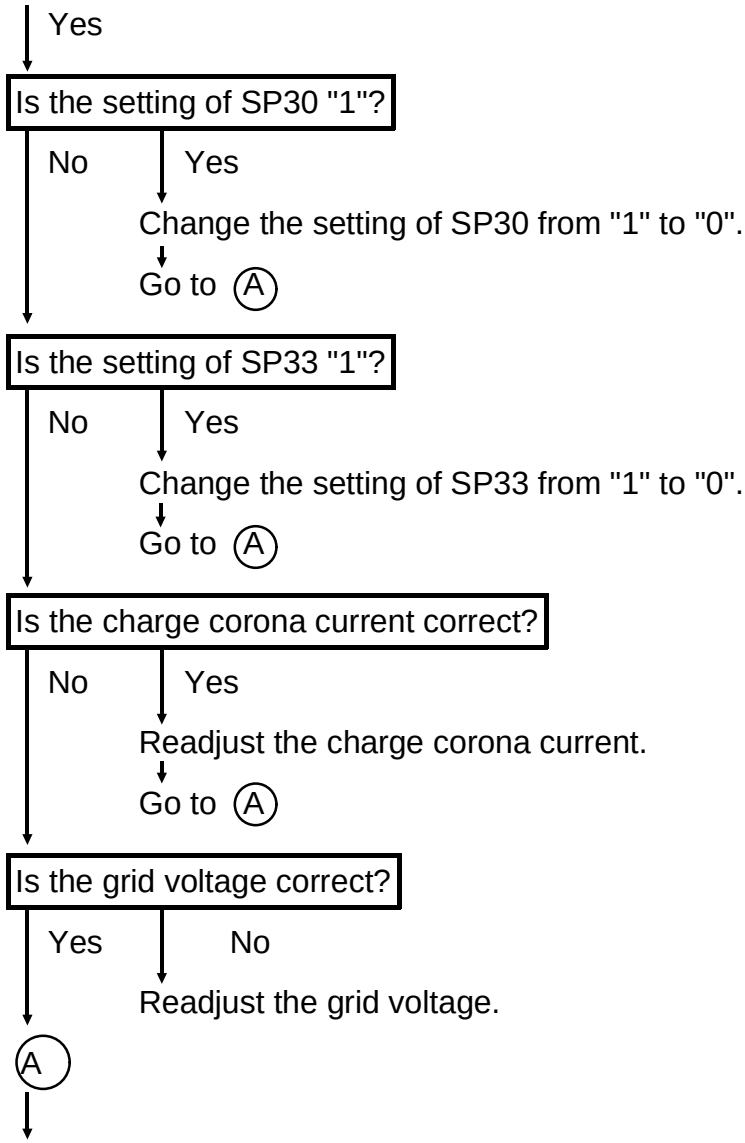
1. Light copy
2. Carrier on the copy.
3. Light spots appear in black solid areas.

- Possible Causes -

1. The light intensity of the exposure lamp is too low.
2. The toner supply clutch does not rotate.
3. The copier is in the fixed toner supply mode.
4. The main board is defective.
5. The ID sensor voltage is too high.
6. The charge corona current is too high.
7. The ID sensor grid voltage is too high.

- Action -





Clean the optics section and around the drum.
Turn on DIP switches 101-1 and 101-2 on the main board. Enter SP55.
Repeat the free run until Vsp becomes lower than 0.103 Vsg.

Perform the necessary SP modes in order (SP95, 48, 56 and 54)

1.14 TONER SCATTERING

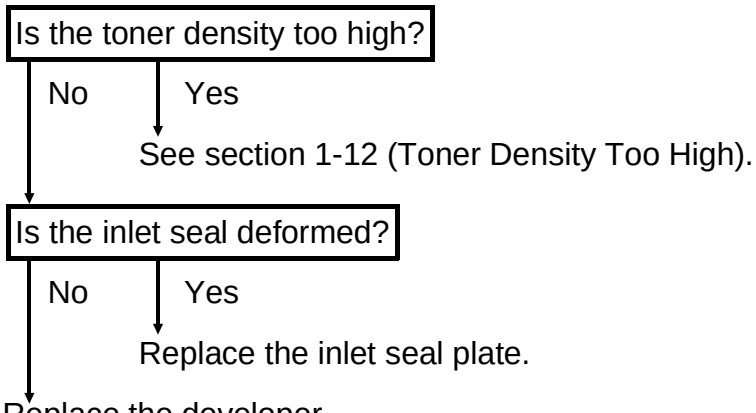
- Problem -

Toner scatters from the development unit.

- Possible Causes -

1. The toner density is too high.
2. The inlet seal on the development unit is out of position.
3. The developer has deteriorated.

- Action -



1.15 UNFUSED COPY IMAGE

- Problem -

Solid images rub off easily.

- Possible Causes -

1. The fusing pressure is too weak.
2. The fusing temperature is too low.
3. The thermistor is malfunctioning.

- Action -

Adjust the position of the pressure springs to increase the fusing pressure.

↓ No good

Increase the fusing temperature using SP79.

↓ No good

Check the thermistor. If the thermistor is malfunctioning, replace it.

1.16 PAPER MISFEED

- Phenomenon -

1. The misfeed location number indicator (PE, J1, J2) turns on when the main switch is turned on, even if there is no paper in the copier.
2. The misfeed location number indicator (PE, J1, J2) always turns on at the same location when copies are made.

- Possible Causes -

1. Defective sensor
2. Mechanical or electrical malfunction

- Action 1 (Initial misfeed) -

Check which sensor (relay sensor, registration sensor or exit sensor) is defective. Replace the defective sensor. If no sensors are defective, replace the main board.

- Action 2 (Misfeed during copy cycle) -

If the PE indicator turns on after the Start key is pressed, check whether the paper tray has run out of paper or not.

No

Yes

Load the paper into the paper tray

Set Jam Detection OFF mode (SP6) to on and make a copy to see whether a misfeed occurs.

Misfeed

No misfeed

Check which sensor (relay sensor, registration sensor or exit sensor) is defective. If sensors are not defective, replace the main board.

Check whether a mechanical or electrical malfunction occurs. Replace the defective parts.

1.17 TRANSFER FAILURE

– Problem –

Poor image transfer or separation jams occur continuously.

– Possible Causes –

1. The transfer or separation corona wire/casing is dirty.
2. Improper transfer on separation corona output.
3. Damp paper.
4. Extremely high humidity and temperature.

– Action –

1. Clean around the Transfer/Separation unit.
2. Check the corona current and adjust if necessary.
3. Instruct the customer to keep paper in a dry place.
4. The pre-transfer lamp (PTL) is available as an optional service part. Install the PTL by following the procedure described in section 5.

1.18 DF ORIGINAL MISFEED OR SKEW

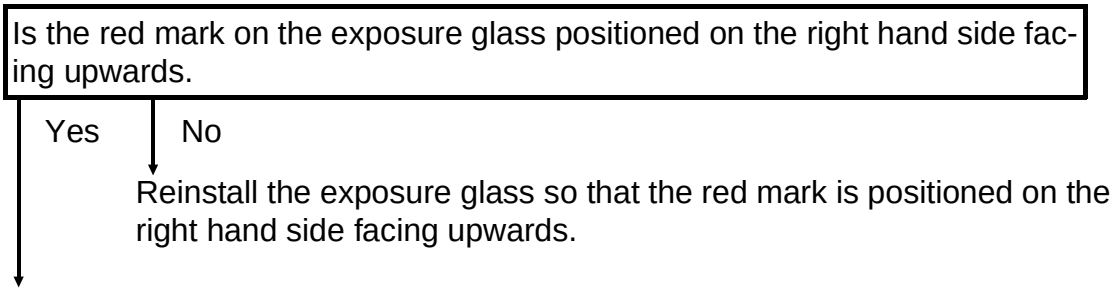
- Problem -

When the DF is in use, the original stops on the exposure glass or is skewed even if the electrical components are functioning normally.

- Possible Causes -

1. The exposure glass is upside-down
2. Friction between the exposure glass and the transport belt

- Action -


Is the red mark on the exposure glass positioned on the right hand side facing upwards.
Yes
No
Reinstall the exposure glass so that the red mark is positioned on the right hand side facing upwards.

Clean the exposure glass surface with alcohol or water. Pour a small amount of silicone oil on the exposure glass and wipe the exposure glass with a dry cloth to reduce the friction between the exposure glass and the transport belt.

2. SERVICE CALL CONDITIONS

2.1 CODE #11 — EXPOSURE LAMP ERROR

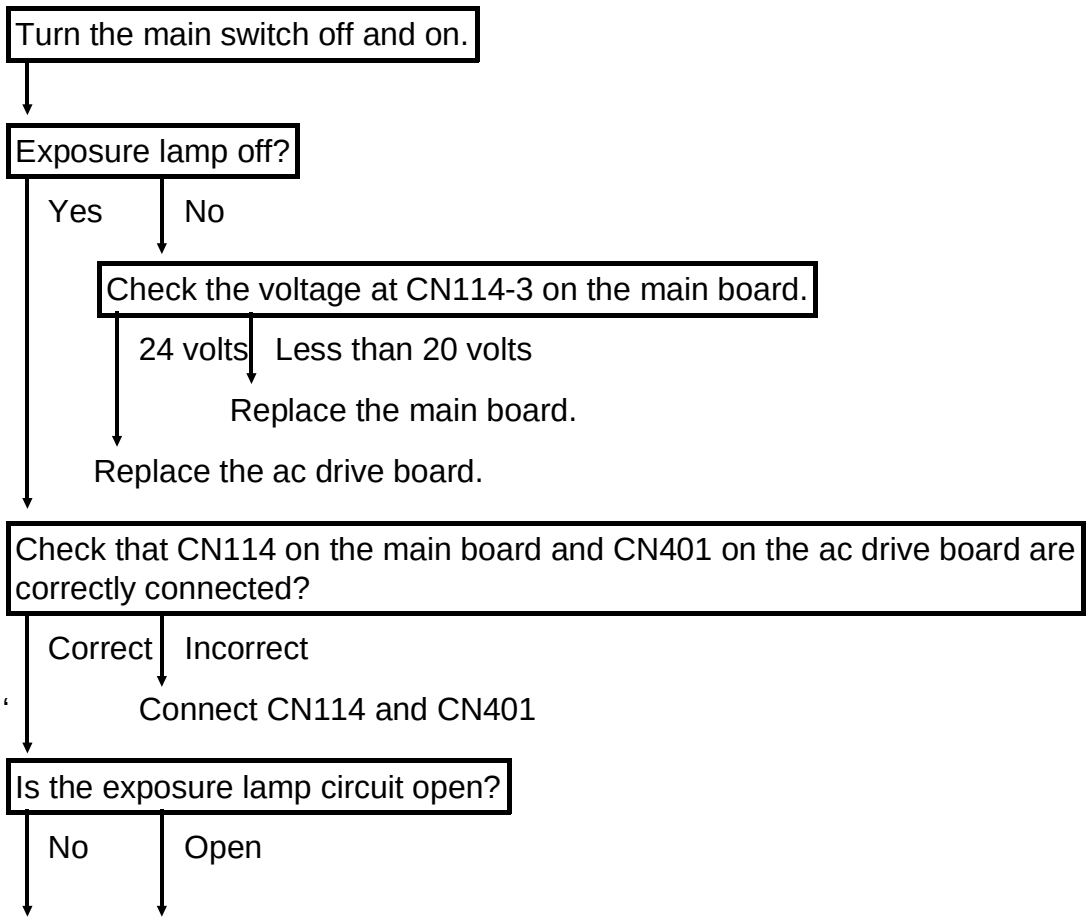
- Definition -

- The feedback signal becomes higher than 4.2 volts (rms) for 1.0 second when the exposure lamp is on.
- The feedback signal becomes higher than 1.0 volt (rms) for 1.0 second when the exposure lamp is off.

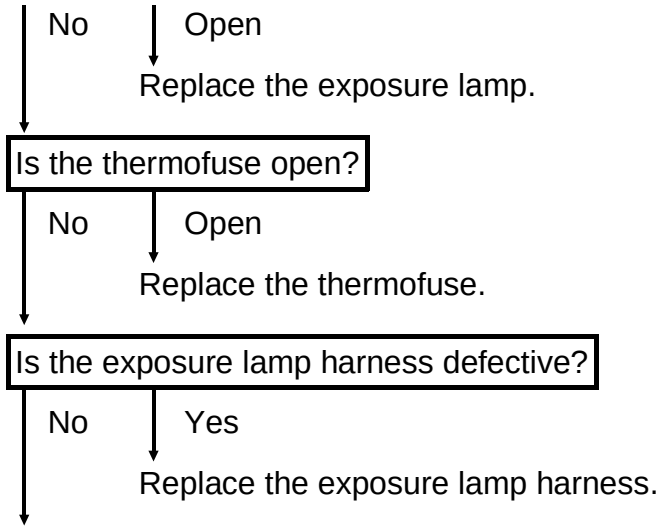
- Possible Causes -

- Exposure lamp open
- Thermofuse open
- Defective ac drive board
- Defective main board
- Defective dc harness
- CN114 on the main board or CN401 on the ac drive board is not correctly connected.

- Action -


Turn the main switch off and on.
Exposure lamp off?
Yes
No
Check the voltage at CN114-3 on the main board.
24 volts
Less than 20 volts
Replace the main board.
Replace the ac drive board.
Check that CN114 on the main board and CN401 on the ac drive board are correctly connected?
Correct
Incorrect
Connect CN114 and CN401
Is the exposure lamp circuit open?
No
Open

TROUBLE-SHOOTING


No
Open
Replace the exposure lamp.
Is the thermofuse open?
No
Open
Replace the thermofuse.
Is the exposure lamp harness defective?
No
Yes
Replace the exposure lamp harness.
Replace the main board.

2.2 CODE #12 — EXPOSURE LAMP ERROR

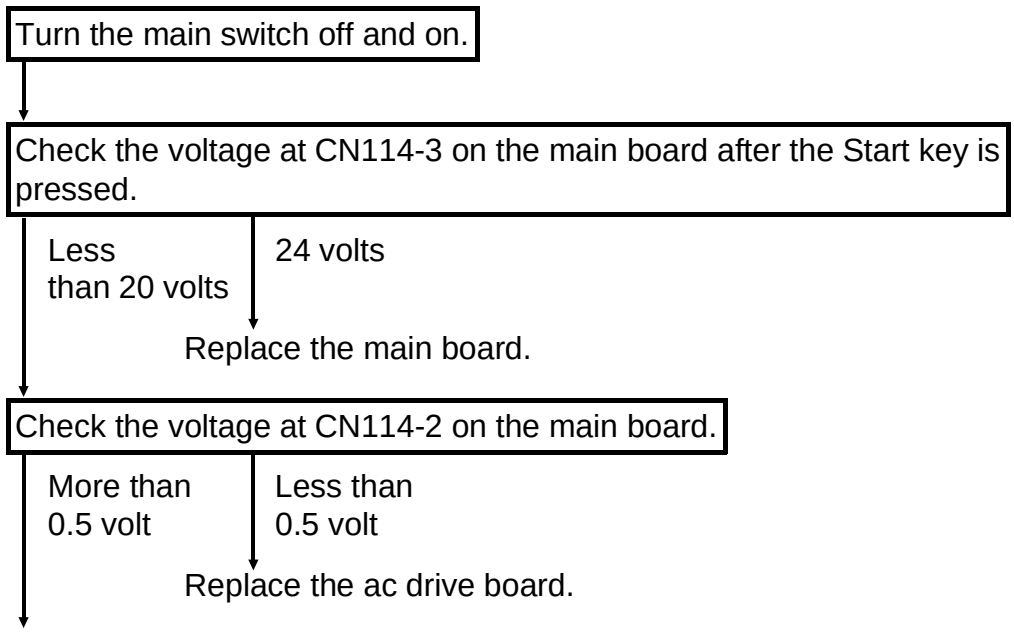
- Definition -

- The feedback signal falls below 0.5 volt (rms) for 1.0 second when the exposure lamp is on.
- The exposure lamp stays on for longer than 10 seconds.

- Possible Causes -

- Defective ac drive board
- Defective main board

- Action -


Turn the main switch off and on.
Check the voltage at CN114-3 on the main board after the Start key is pressed.
Less than 20 volts
24 volts
Replace the main board.
Check the voltage at CN114-2 on the main board.
More than 0.5 volt
Less than 0.5 volt
Replace the ac drive board.
Replace the main board.

2.3 CODE #13 — ZERO CROSS SIGNAL ERROR

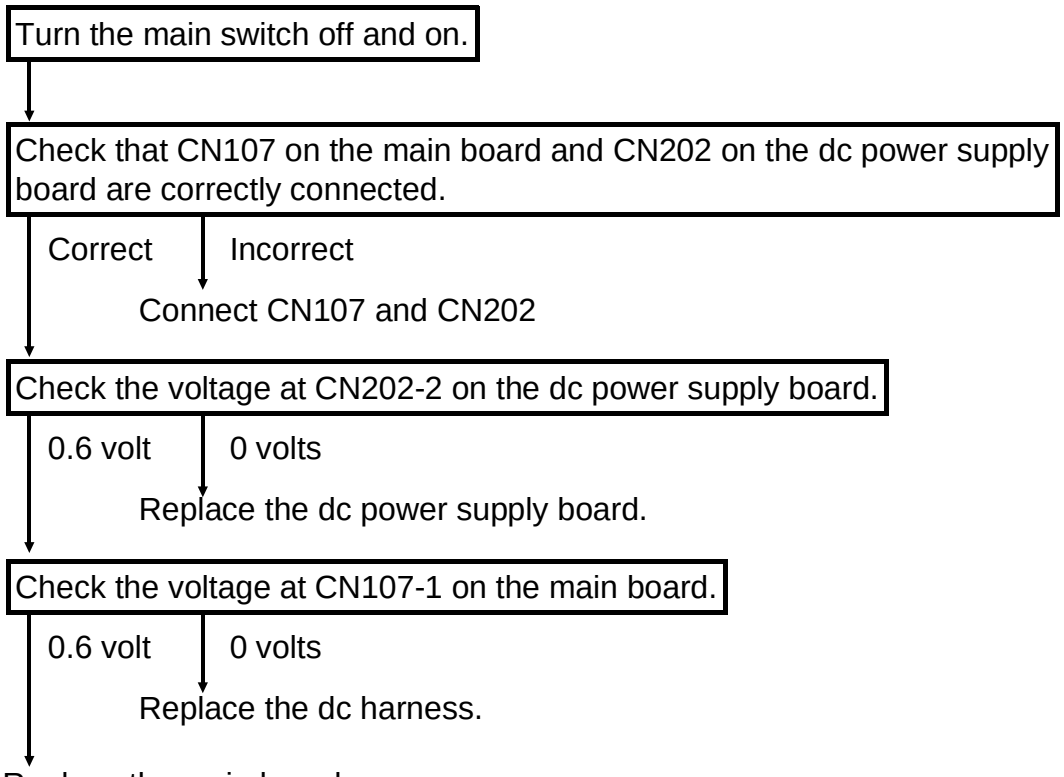
- Definition -

The CPU does not receive the zero cross signal within 0.56 second.

- Possible Causes -

- Defective main board
- Defective dc power supply board
- Zero cross line open
- CN107 on the main board or CN202 on the dc power supply board is not correctly connected.

- Action -


Turn the main switch off and on.
Check that CN107 on the main board and CN202 on the dc power supply board are correctly connected.
Correct
Incorrect
Connect CN107 and CN202
Check the voltage at CN202-2 on the dc power supply board.
0.6 volt
0 volts
Replace the dc power supply board.
Check the voltage at CN107-1 on the main board.
0.6 volt
0 volts
Replace the dc harness.
Replace the main board.

2.4 CODE #21 — SCANNER HOME POSITION ERROR

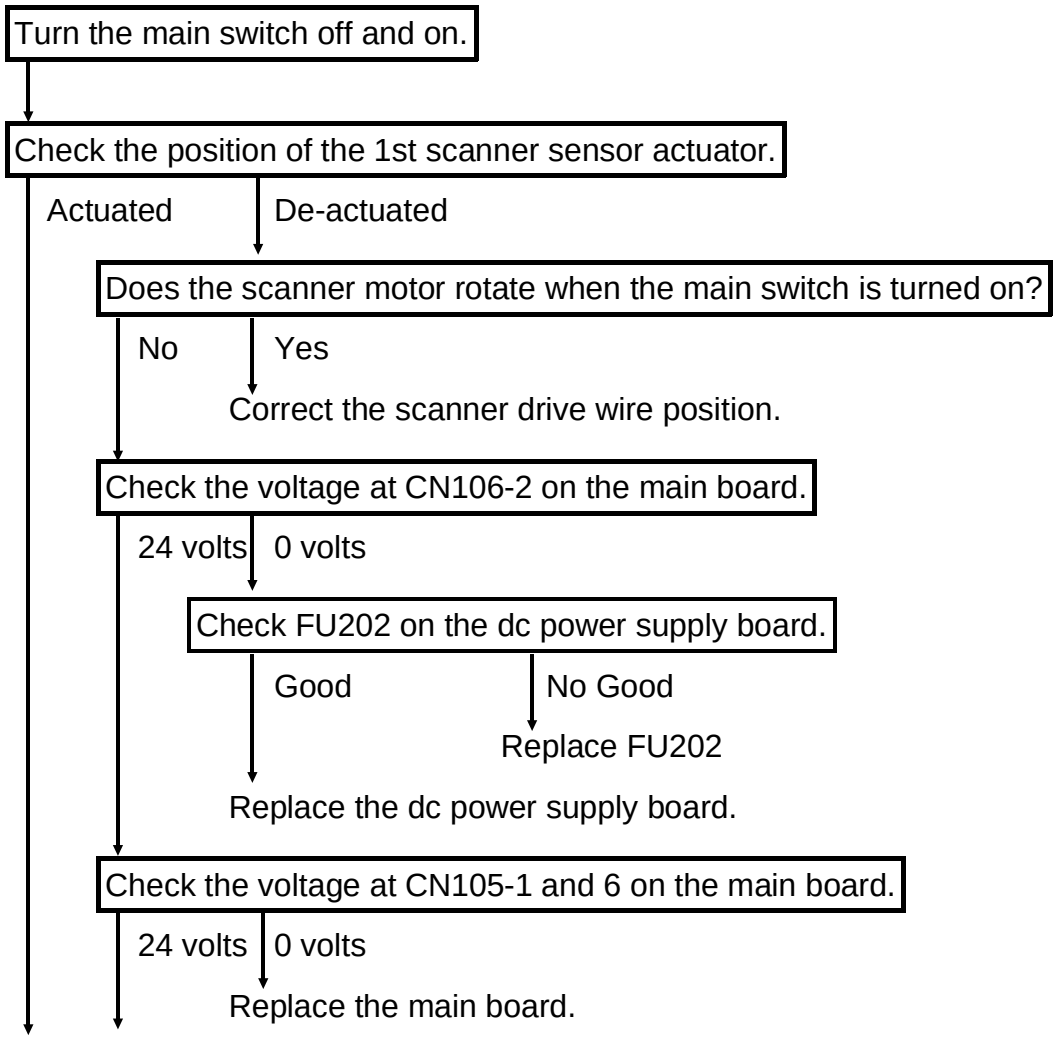
- Definition -

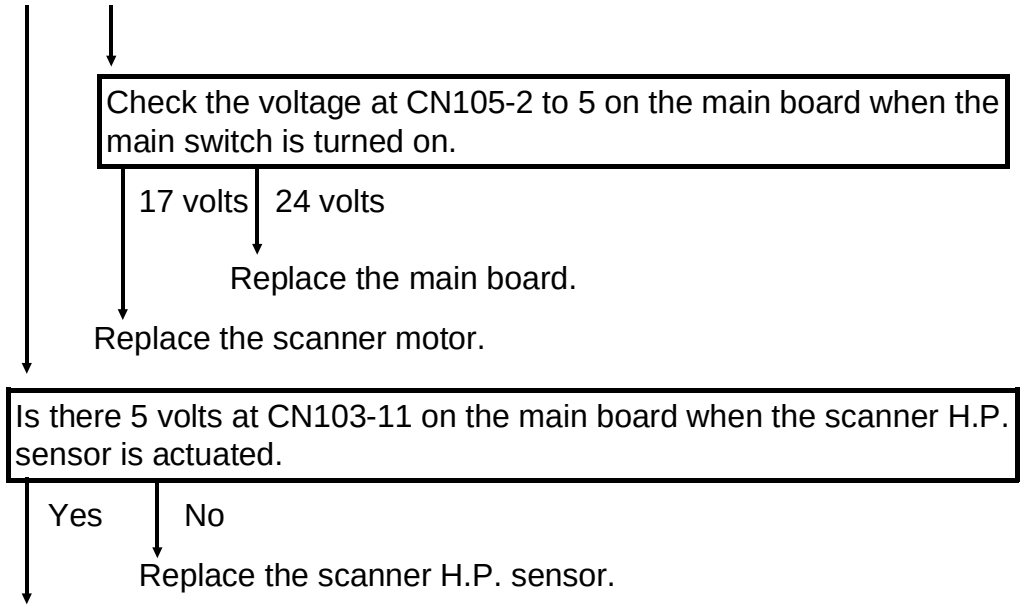
The scanner home position sensor's output remains LOW (de-actuated) for 9 seconds after the main switch is turned on.

- Possible Causes -

- Scanner home position sensor failure
- Defective scanner motor
- Defective main board
- Defective dc power supply board
- Incorrect scanner drive wire position
- FU202 on the dc power supply board open (blown fuse).

- Action -


Turn the main switch off and on.
Check the position of the 1st scanner sensor actuator.
Actuated
De-actuated
Does the scanner motor rotate when the main switch is turned on?
No
Yes
Correct the scanner drive wire position.
Check the voltage at CN106-2 on the main board.
24 volts
0 volts
Check FU202 on the dc power supply board.
Good
No Good
Replace FU202
Replace the dc power supply board.
Check the voltage at CN105-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.


Check the voltage at CN105-2 to 5 on the main board when the main switch is turned on.
17 volts
24 volts
Replace the main board.
Replace the scanner motor.
Is there 5 volts at CN103-11 on the main board when the scanner H.P. sensor is actuated.
Yes
No
Replace the scanner H.P. sensor.
Replace the main board.

2.5 CODE #22 — SCANNER HOME POSITION ERROR

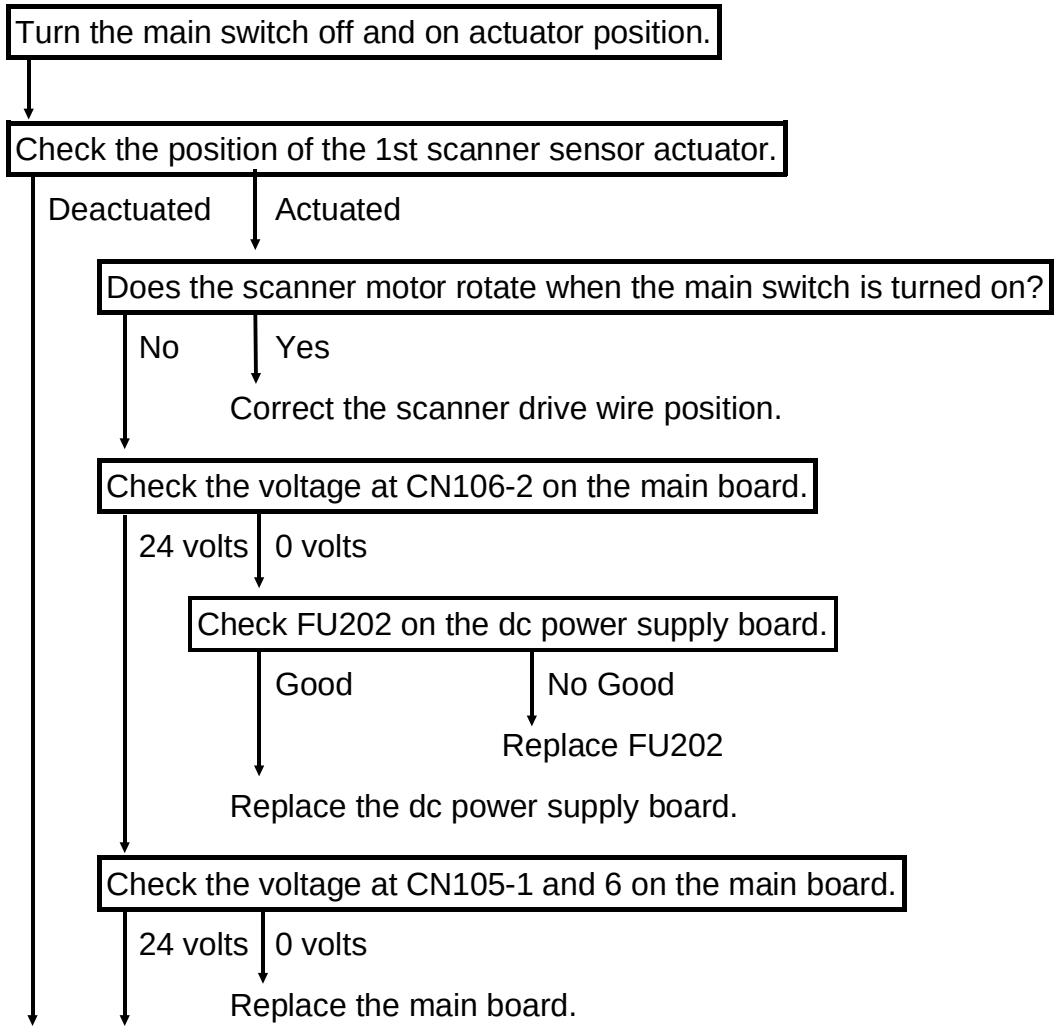
- Definition -

The scanner home position sensor's output remains HIGH (actuated) for 1.0 second after the scanner starts.

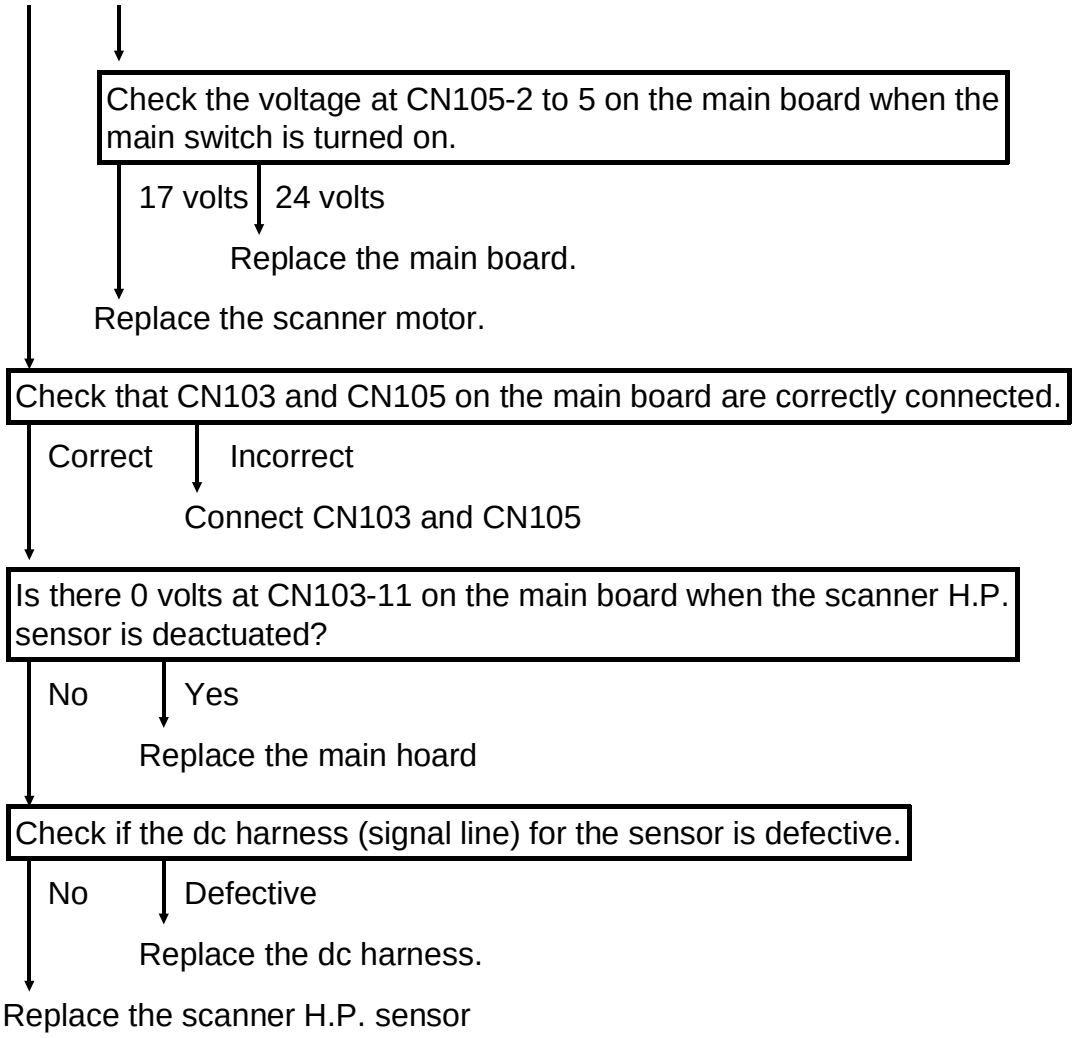
- Possible Causes -

- Scanner home position sensor failure
- Defective scanner motor
- Defective main motor
- Defective dc power supply board
- Incorrect scanner drive wire position
- Defective dc harness
- CN103 or CN105 on the main board is not correctly connected.
- FU202 on the dc power supply board open (blown fuse).

- Action -


Turn the main switch off and on actuator position.
Check the position of the 1st scanner sensor actuator.
Deactuated
Actuated
Does the scanner motor rotate when the main switch is turned on?
No
Yes
Correct the scanner drive wire position.
Check the voltage at CN106-2 on the main board.
24 volts
0 volts
Check FU202 on the dc power supply board.
Good
No Good
Replace FU202
Replace the dc power supply board.
Check the voltage at CN105-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.

TROUBLE-SHOOTING


Check the voltage at CN105-2 to 5 on the main board when the main switch is turned on.
17 volts
24 volts
Replace the main board.
Replace the scanner motor.
Check that CN103 and CN105 on the main board are correctly connected.
Correct
Incorrect
Connect CN103 and CN105
Is there 0 volts at CN103-11 on the main board when the scanner H.P. sensor is deactuated?
No
Yes
Replace the main hoard
Check if the dc harness (signal line) for the sensor is defective.
No
Defective
Replace the dc harness.
Replace the scanner H.P. sensor

2.6 CODE #28 — LENS HOME POSITION ERROR (FT3213 COPIER ONLY)

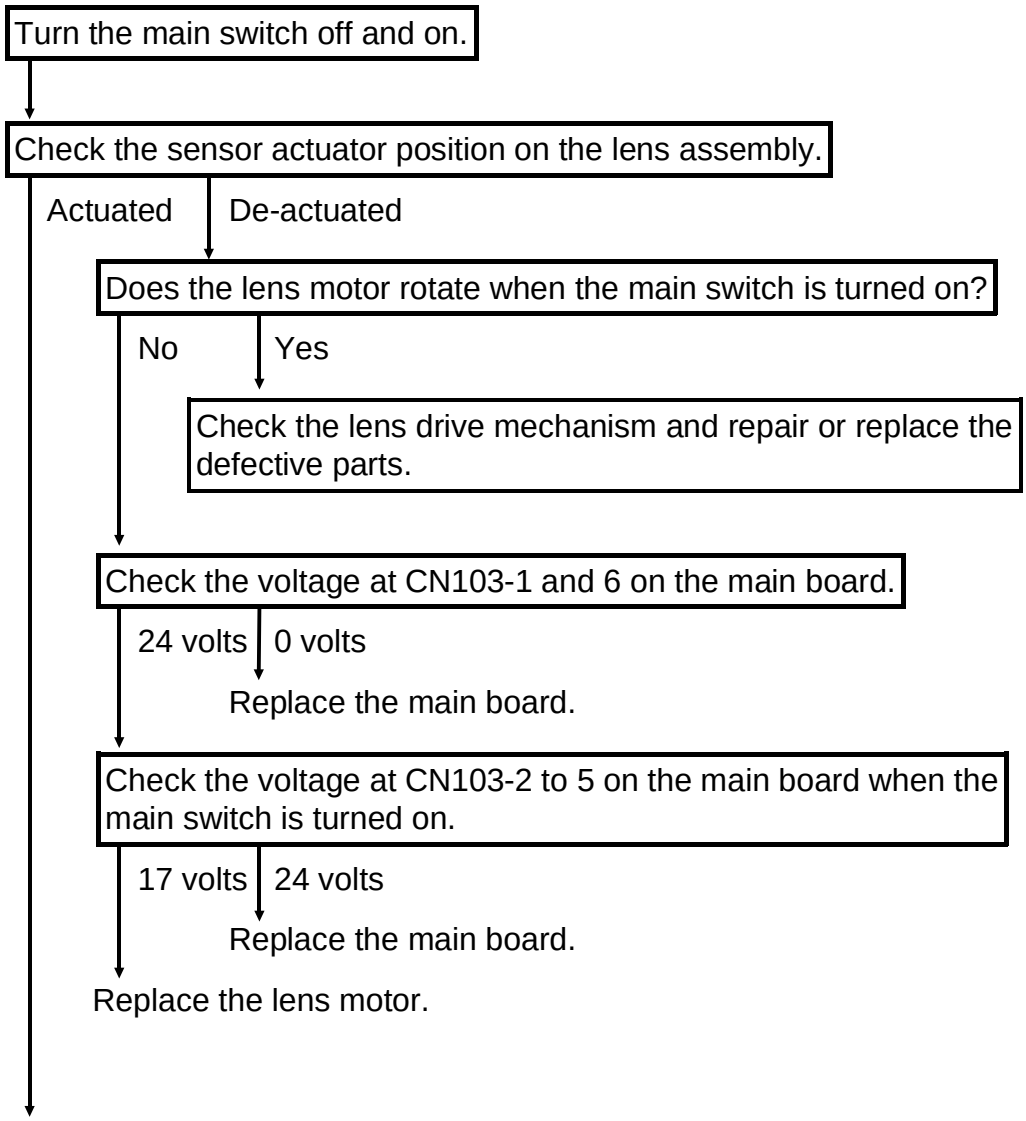
- Definition -

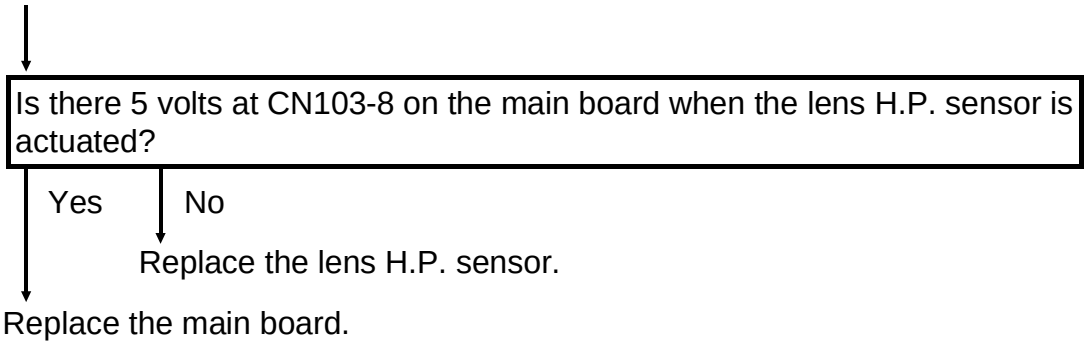
The lens home position sensor's output remains LOW (de-actuated) for 6.0 seconds after the lens moves to the home position.

- Possible Causes -

- Lens home position sensor failure
- Defective lens drive motor
- Defective Main board
- Defective lens drive mechanism

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the lens assembly.
Actuated
De-actuated
Does the lens motor rotate when the main switch is turned on?
No
Yes
Check the lens drive mechanism and repair or replace the defective parts.
Check the voltage at CN103-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.
Check the voltage at CN103-2 to 5 on the main board when the main switch is turned on.
17 volts
24 volts
Replace the main board.
Replace the lens motor.


Is there 5 volts at CN103-8 on the main board when the lens H.P. sensor is actuated?
Yes
No
Replace the lens H.P. sensor.
Replace the main board.

2.7 CODE #29 — LENS HOME POSITION ERROR (FT3213 COPIER ONLY)

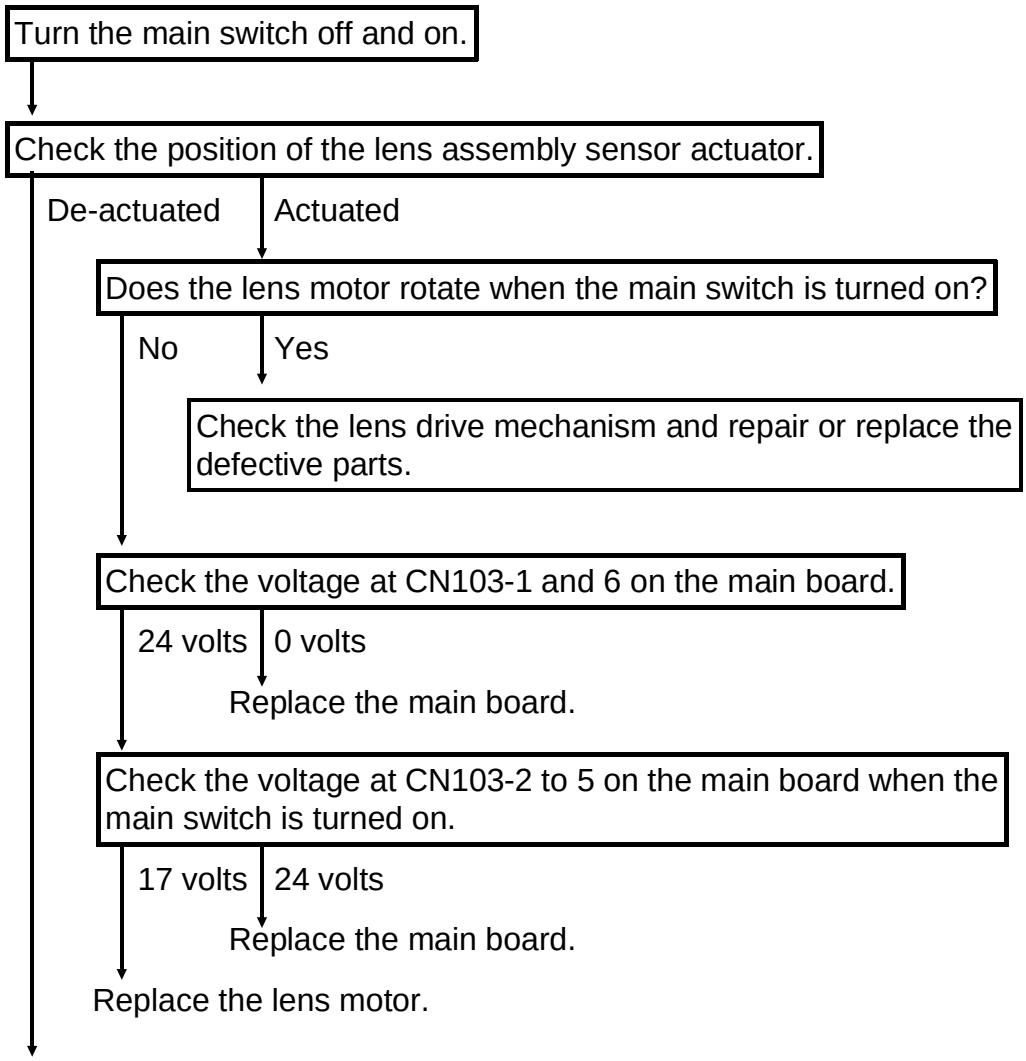
- Definition -

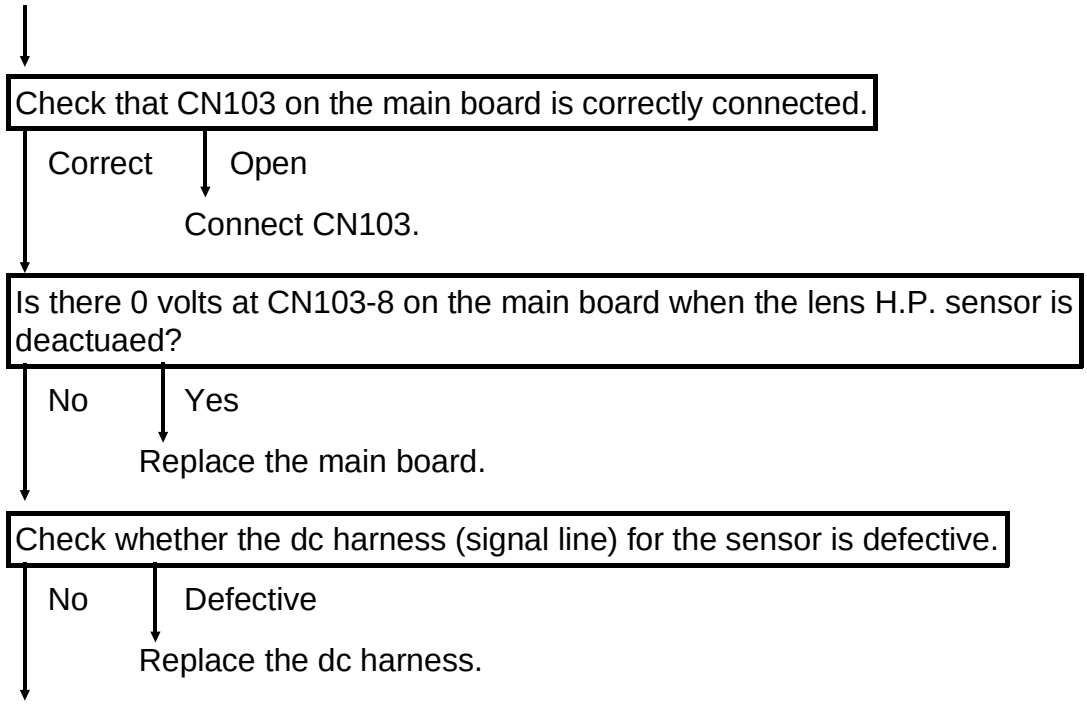
The lens home position sensor's output remains HIGH (actuated) for 4.0 seconds after the lens leaves the home position.

- Possible Causes -

- Lens home position sensor failure
- Defective lens drive motor
- Defective main board
- Defective lens drive mechanism
- Defective dc harness
- CN103 on the main board is not correctly connected.

- Action -


Turn the main switch off and on.
Check the position of the lens assembly sensor actuator.
De-actuated
Actuated
Does the lens motor rotate when the main switch is turned on?
No
Yes
Check the lens drive mechanism and repair or replace the defective parts.
Check the voltage at CN103-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.
Check the voltage at CN103-2 to 5 on the main board when the main switch is turned on.
17 volts
24 volts
Replace the main board.
Replace the lens motor.


Check that CN103 on the main board is correctly connected.
Correct
Open
Connect CN103.
Is there 0 volts at CN103-8 on the main board when the lens H.P. sensor is deactuaed?
No
Yes
Replace the main board.
Check whether the dc harness (signal line) for the sensor is defective.
No
Defective
Replace the dc harness.
Replace the lens H.P. sensor.

2.8 CODE #2A — 4TH/5TH MIRROR HOME POSITION ERROR (FT3213 COPIER ONLY)

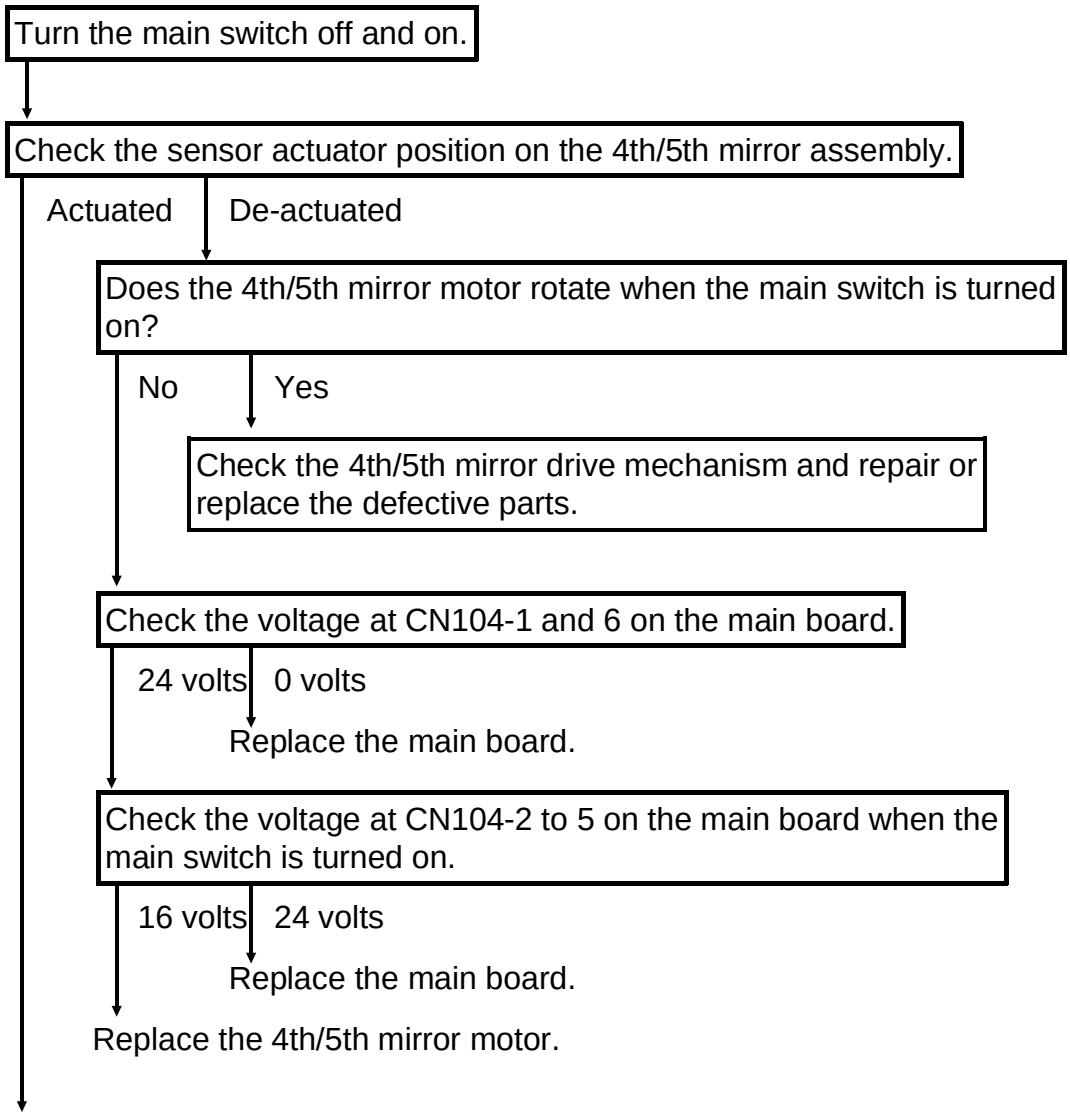
- Definition -

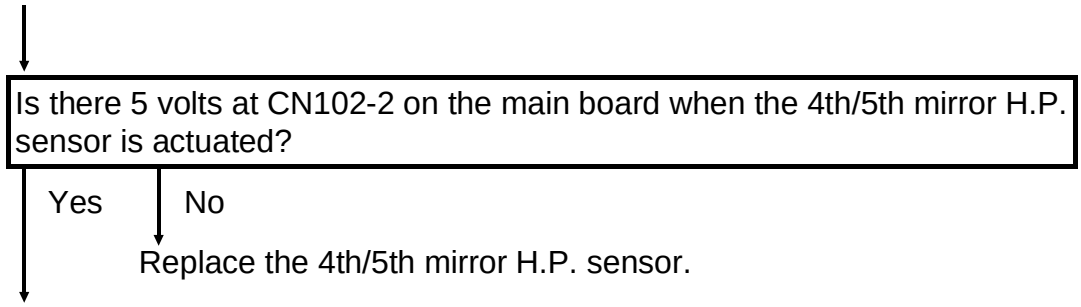
The 4th/5th mirror home position sensor's output remains LOW (de-actuated) for 2.5 seconds after the 4th/5th mirror assembly moves to the home position.

- Possible Causes -

- 4th/5th mirror home position sensor failure
- Defective 4th/5th mirror motor
- Defective main board
- Defective 4th/5th mirror drive mechanism

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the 4th/5th mirror assembly.
Actuated
De-actuated
Does the 4th/5th mirror motor rotate when the main switch is turned on?
No
Yes
Check the 4th/5th mirror drive mechanism and repair or replace the defective parts.
Check the voltage at CN104-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.
Check the voltage at CN104-2 to 5 on the main board when the main switch is turned on.
16 volts
24 volts
Replace the main board.
Replace the 4th/5th mirror motor.


Is there 5 volts at CN102-2 on the main board when the 4th/5th mirror H.P. sensor is actuated?
Yes
No
Replace the 4th/5th mirror H.P. sensor.
Replace the main board.

2.9 CODE #2B — 4TH/5TH MIRROR HOME POSITION ERROR (FT3213 COPIER ONLY)

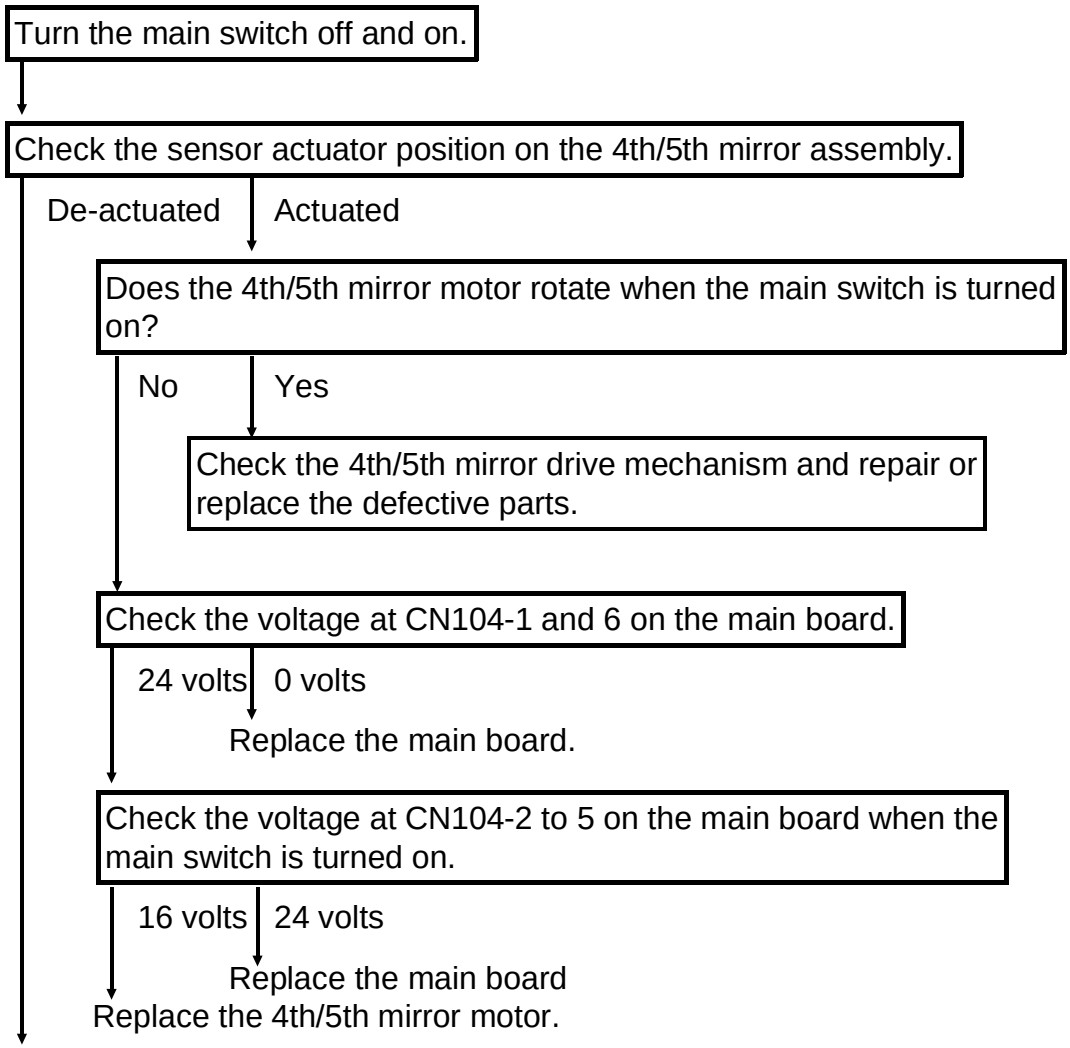
- Definition -

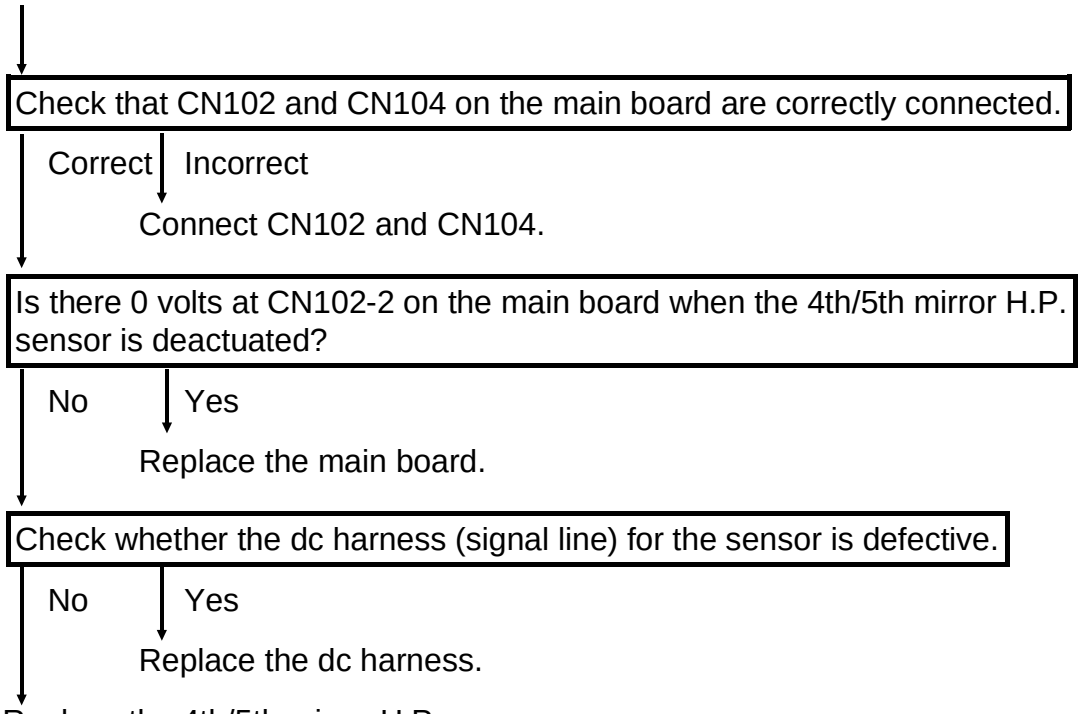
The 4th/5th mirror home position sensor's output remains HIGH (actuated) for 4.0 seconds after the 4th/5th mirror assembly leaves the home position.

- Possible Causes -

- 4th/5th mirror home position sensor failure
- Defective 4th/5th mirror motor
- Defective main board
- Defective 4th/5th mirror drive mechanism
- Defective dc harness
- CN102 or CN104 on the main board is not correctly connected.

- Action -


Turn the main switch off and on.
Check the sensor actuator position on the 4th/5th mirror assembly.
De-actuated
Actuated
Does the 4th/5th mirror motor rotate when the main switch is turned on?
No
Yes
Check the 4th/5th mirror drive mechanism and repair or replace the defective parts.
Check the voltage at CN104-1 and 6 on the main board.
24 volts
0 volts
Replace the main board.
Check the voltage at CN104-2 to 5 on the main board when the main switch is turned on.
16 volts
24 volts
Replace the main board
Replace the 4th/5th mirror motor.


Check that CN102 and CN104 on the main board are correctly connected.
Correct
Incorrect
Connect CN102 and CN104.
Is there 0 volts at CN102-2 on the main board when the 4th/5th mirror H.P. sensor is deactuated?
No
Yes
Replace the main board.
Check whether the dc harness (signal line) for the sensor is defective.
No
Yes
Replace the dc harness.
Replace the 4th/5th mirror H.P. sensor.

2.10 CODE #40 – OPTICS THERMISTOR ERROR

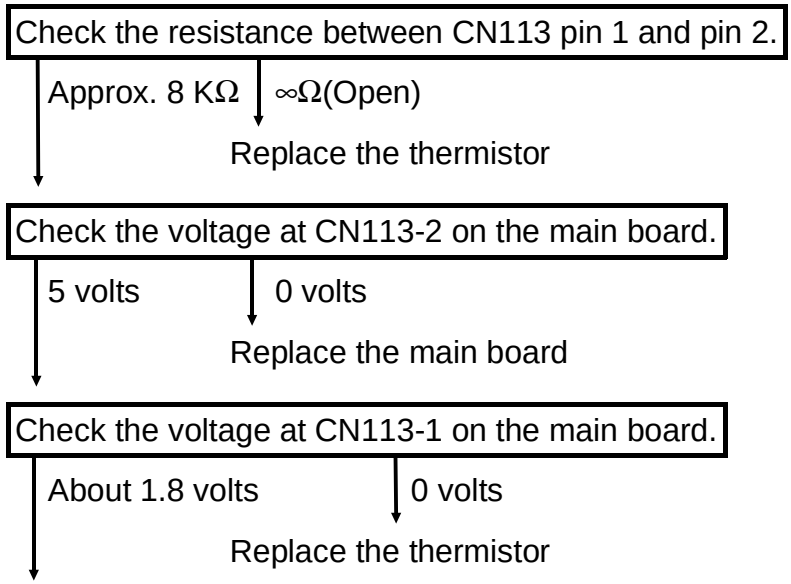
-Definition-

The optics thermistor is open.

-Possible Cause-

- Defective thermistor
- Defective main board
- CN113 on the main board is not correctly connected.

-Action-


Check the resistance between CN113 pin 1 and pin 2.
Approx. 8 KΩ
∞Ω(Open)
Replace the thermistor
Check the voltage at CN113-2 on the main board.
5 volts
0 volts
Replace the main board
Check the voltage at CN113-1 on the main board.
About 1.8 volts
0 volts
Replace the thermistor

Replace the main board

2.11 CODE #52 — FUSING WARM-UP ERROR

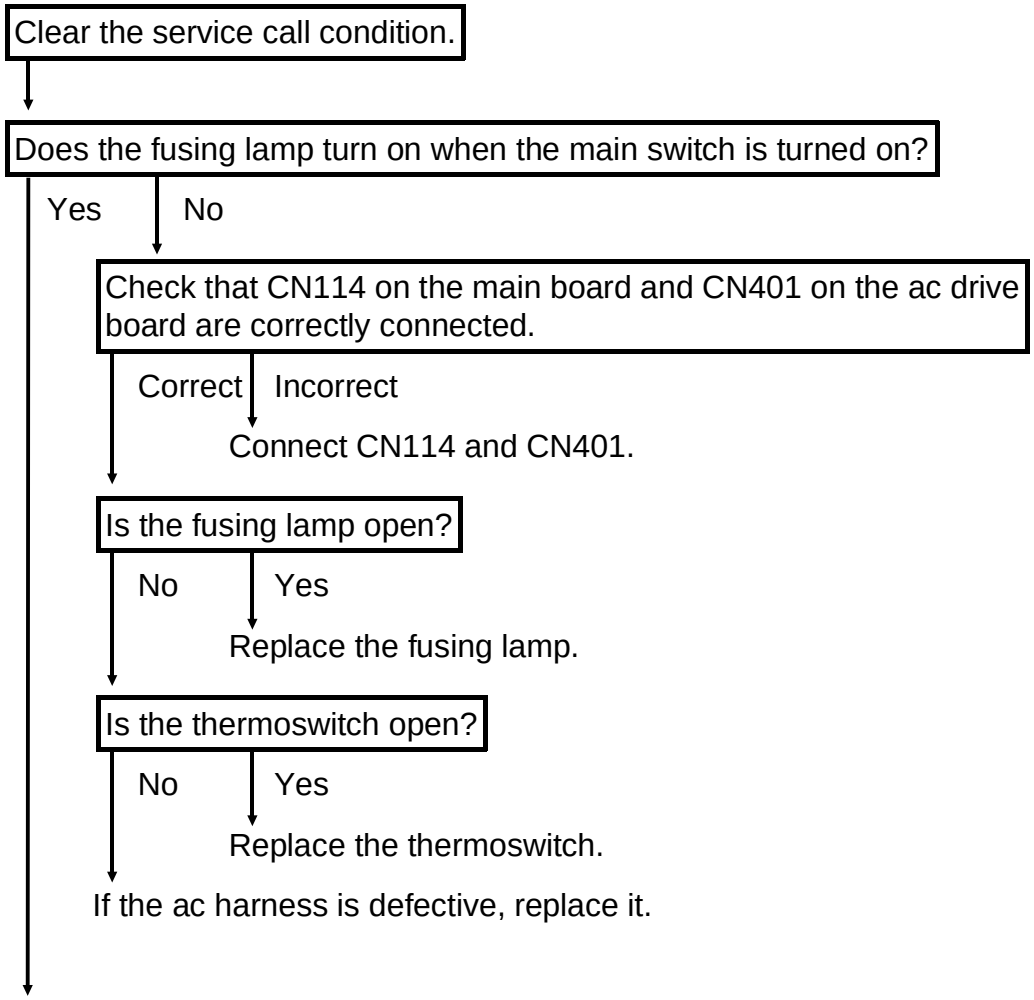
- Definition -

The temperature detected by the thermistor does not reach 150℃ within 45 seconds after the main switch is turned on.

- Possible Causes -

- Thermistor position error
- Fusing lamp open
- Thermoswitch open
- Defective ac drive board
- Defective main board
- Defective ac harness
- CN114 on the main board or CN401 on the ac drive board is not correctly connected.

- Action -


Clear the service call condition.
Does the fusing lamp turn on when the main switch is turned on?
Yes
No
Check that CN114 on the main board and CN401 on the ac drive board are correctly connected.
Correct
Incorrect
Connect CN114 and CN401.
Is the fusing lamp open?
No
Yes
Replace the fusing lamp.
Is the thermoswitch open?
No
Yes
Replace the thermoswitch.
If the ac harness is defective, replace it.

Yes

Check the voltage at CN114-6 on the main board.

0 volts

24 volts

Replace the main board.

Check the voltage at CN114-4 on the main board.

0 volts

24 volts

Replace the main board.

Check the voltage at CN114-8 on the main board.

24 volts

0 volts

Replace the main board.

Does the thermistor properly contact the hot roller?

Yes

No

Correctly position the thermistor.

Does the voltage at TP102 on the main board increase after the main switch is turned on?

Yes

No

Replace the thermistor.

Replace the ac drive board.

2.12 CODE #53 — FUSING OVERHEAT

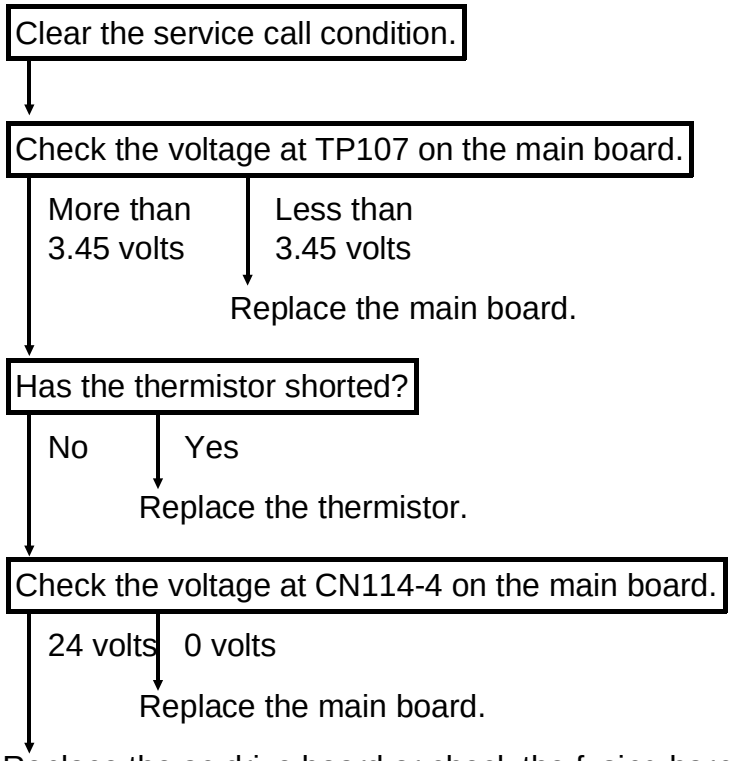
- Definition -

The temperature detected by the thermistor becomes higher than 240°C.

- Possible Causes -

- Thermistor short
- Defective ac drive board
- Defective main board
- Fusing harness shorted

- Action -


Clear the service call condition.
Check the voltage at TP107 on the main board.
More than 3.45 volts
Less than 3.45 volts
Replace the main board.
Has the thermistor shorted?
No
Yes
Replace the thermistor.
Check the voltage at CN114-4 on the main board.
24 volts
0 volts
Replace the main board.

Replace the ac drive board or check the fusing harness.

2.13 CODE #55 — FUSING THERMISTOR OPEN

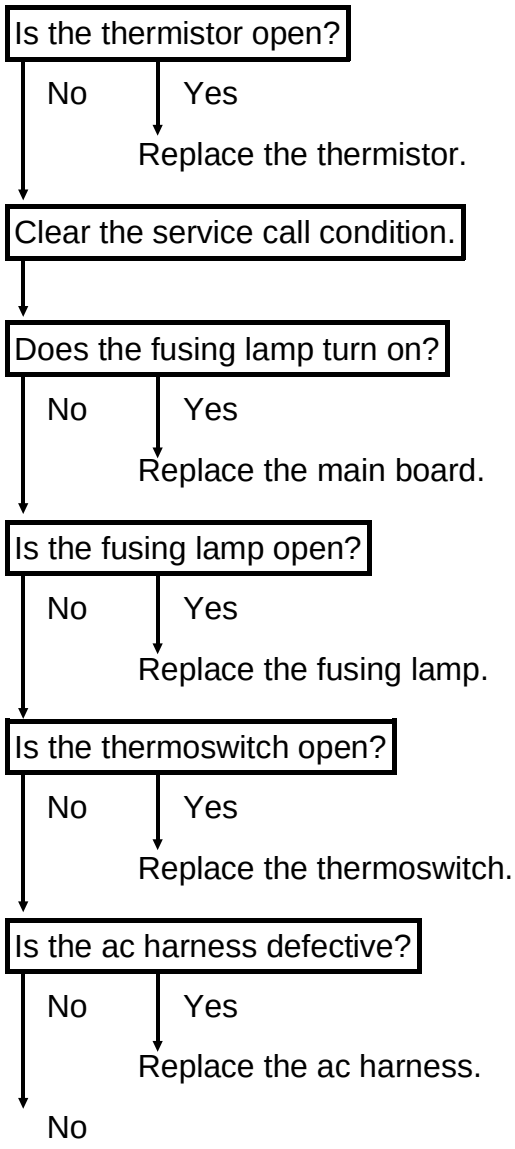
- Definition -

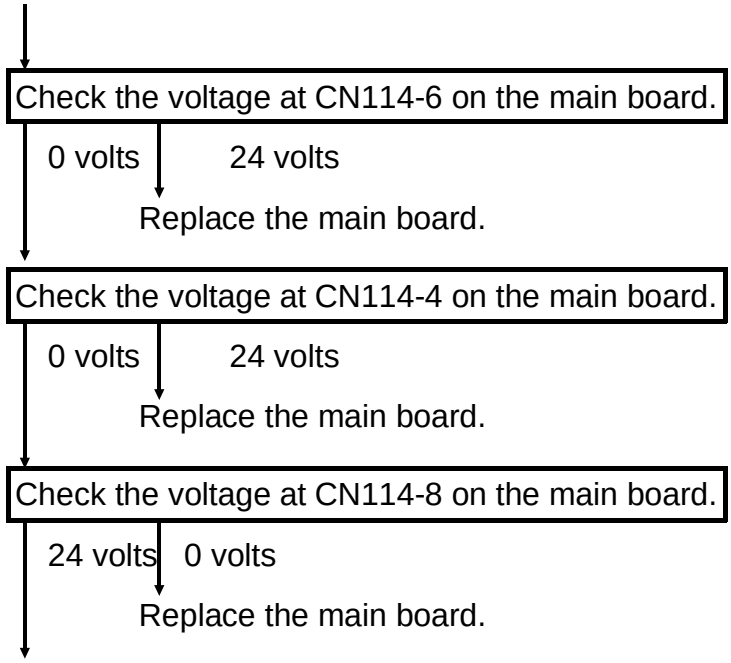
The temperature value output by the thermistor does not reach 2°C within 20 seconds after the main switch is turned on.

- Possible Causes -

- Thermistor open
- Defective main board
- Defective ac drive board
- Fusing lamp open
- Thermoswitch open
- Defective ac harness

- Action -




Check the voltage at CN114-6 on the main board.
0 volts
24 volts
Replace the main board.
Check the voltage at CN114-4 on the main board.
0 volts
24 volts
Replace the main board.
Check the voltage at CN114-8 on the main board.
24 volts
0 volts
Replace the main board.
Replace the ac drive board.

2.14 CODE #96 — DF TIMING PULSE ERROR

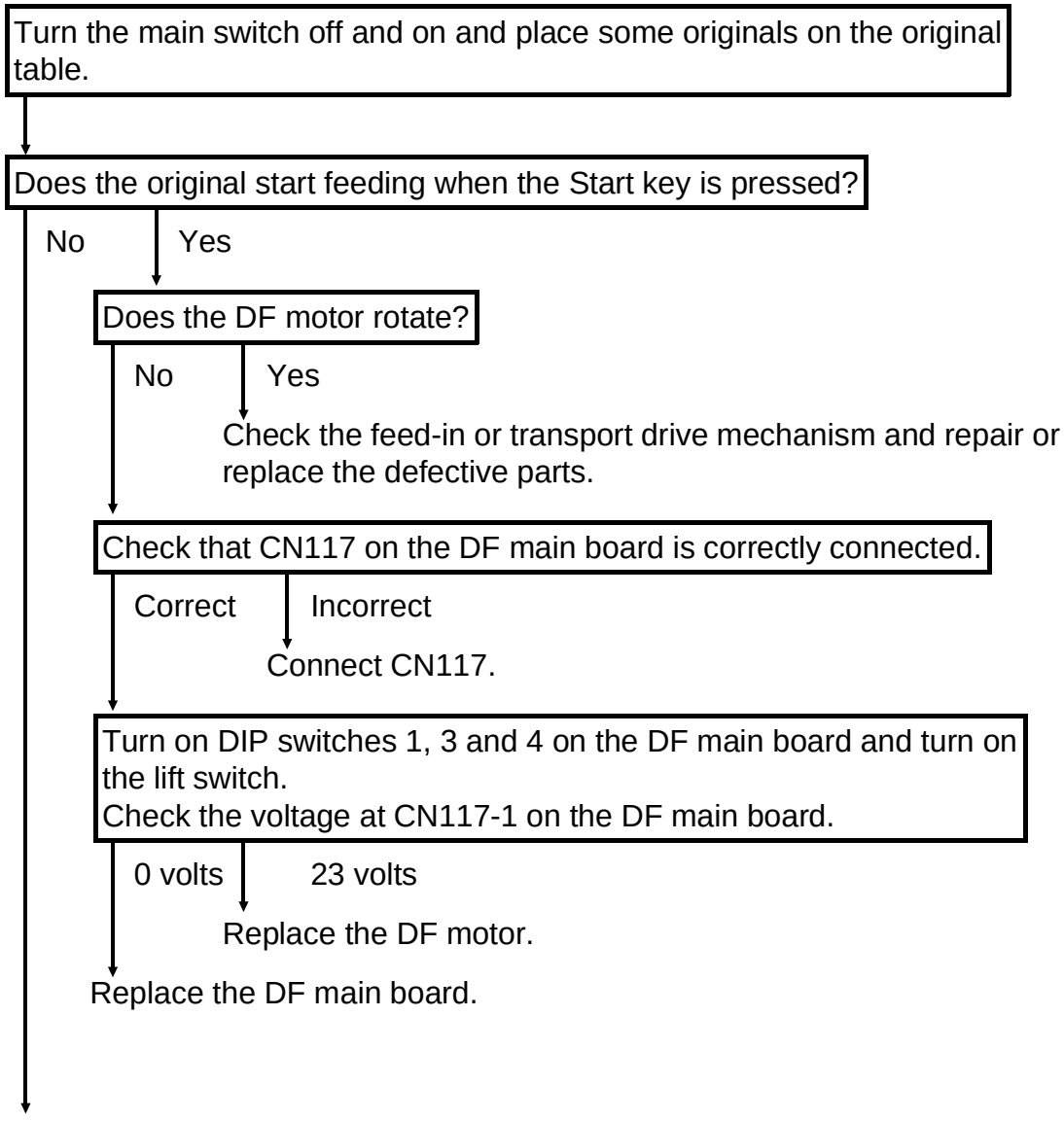
- Definition -

The DF CPU does not receive a DF timing pulse within 100 milliseconds.

- Possible Causes -

- Defective DF main board
- Defective DF motor
- Pulse generator sensor failure
- Defective feed-in or transport mechanism
- CN113 or CN117 on the DF main board or CN121 on the pulse generator sensor is not correctly connected.

- Action -


Turn the main switch off and on and place some originals on the original table.
Does the original start feeding when the Start key is pressed?
No
Yes
Does the DF motor rotate?
No
Yes
Check the feed-in or transport drive mechanism and repair or replace the defective parts.
Check that CN117 on the DF main board is correctly connected.
Correct
Incorrect
Connect CN117.
Turn on DIP switches 1, 3 and 4 on the DF main board and turn on the lift switch.
Check the voltage at CN117-1 on the DF main board.
0 volts
23 volts
Replace the DF motor.
Replace the DF main board.

No

Check that CN113 on the DF main board and CN121 on the pulse generator sensor are correctly connected.

Correct

Incorrect

Connect CN113 and CN121.

Turn on DIP switches 1, 3 and 4 on the DF main board and turn on the lift switch. Check the voltage at CN113 on the DF main board.

1.5 volts

0 volts

Replace the pulse generator sensor.

Replace the DF main board.

2.15 DF COMMUNICATION ERROR

- Problem -

The original misfeed indicator blinks (no SC code is indicated).

- Definition -

The DF CPU does not receive the "DF confirmed" signal from the copier CPU when the main switch is turned on.

- Possible Causes -

- The optical fiber cable is not correctly connected to the DF main board or the DF interface board.
- CN2 on the DF interface board or CN120 on the main board is not correctly connected.
- Defective optics fiber cable
- Defective main board
- Defective DF main board
- Defective DF interface board
- Defective dc harness between CN2 and CN120

2.16 ABNORMAL CONDITION IN TONER DENSITY DETECTION

- Problem -

The Auto ID indicator or the selected manual ID level blinks. (No SC Code is indicated.)

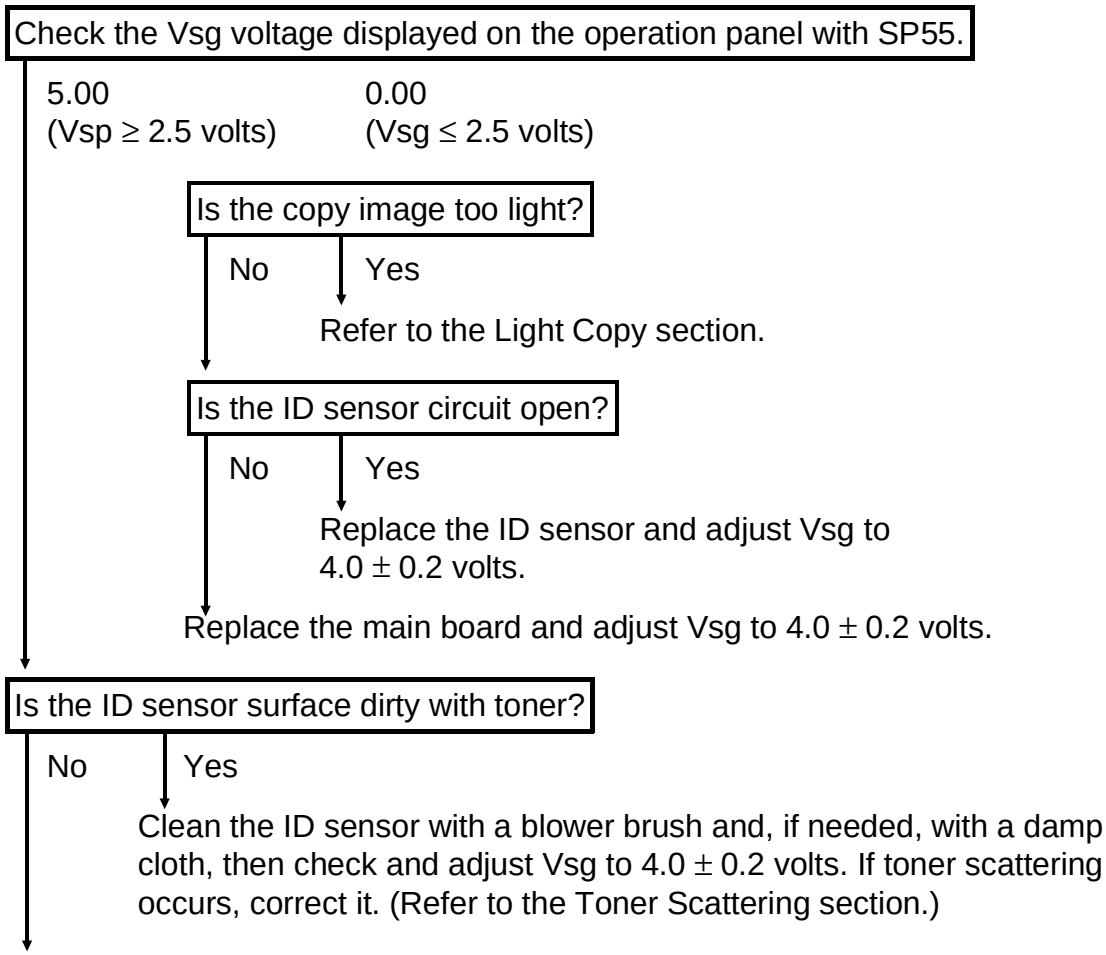
- Definition -

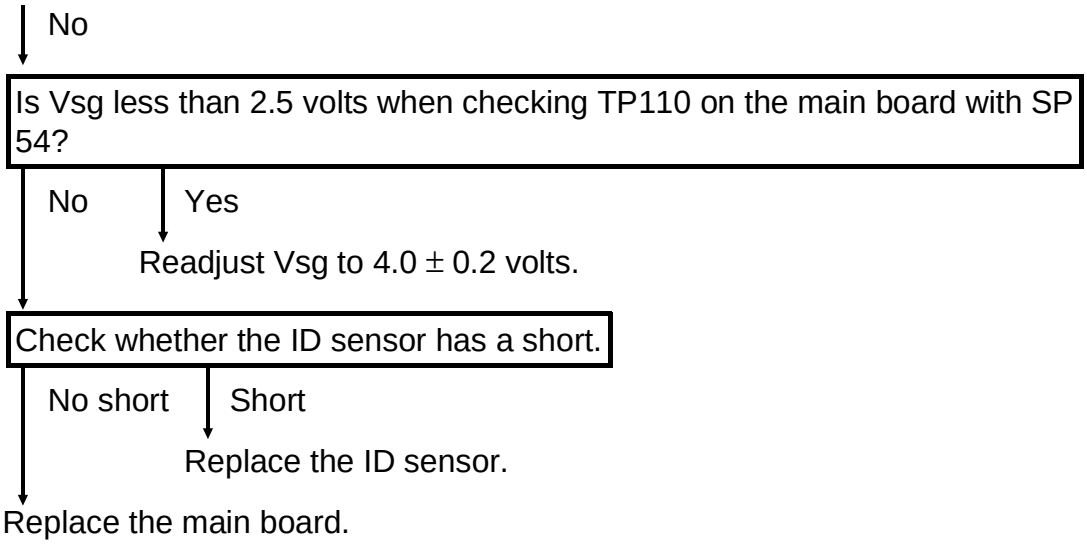
If Vsg goes below 2.5 volts or Vsp goes above 2.5 volts five times in a row.

- Possible Causes -

- Incorrect Vsg voltage
- Dirty ID sensor
- Low toner density
- Defective ID sensor
- Defective main board

- Action -


Check the Vsg voltage displayed on the operation panel with SP55.
5.00
(Vsp ≥ 2.5 volts)
0.00
(Vsg ≤ 2.5 volts)
Is the copy image too light?
No
Yes
Refer to the Light Copy section.
Is the ID sensor circuit open?
No
Yes
Replace the ID sensor and adjust Vsg to 4.0 ± 0.2 volts.
Replace the main board and adjust Vsg to 4.0 ± 0.2 volts.
Is the ID sensor surface dirty with toner?
No
Yes
Clean the ID sensor with a blower brush and, if needed, with a damp cloth, then check and adjust Vsg to 4.0 ± 0.2 volts. If toner scattering occurs, correct it. (Refer to the Toner Scattering section.)


No
Is Vsg less than 2.5 volts when checking TP110 on the main board with SP 54?
No
Yes
Readjust Vsg to 4.0 ± 0.2 volts.
Check whether the ID sensor has a short.
No short
Short
Replace the ID sensor.
Replace the main board.

2.17 OPTICS OVER HEAT PROTECTION (FT3013 Copier Only)

- Problem -

The Energy Saver Function key blinks. (No SC code is indicated.)

- Definition -

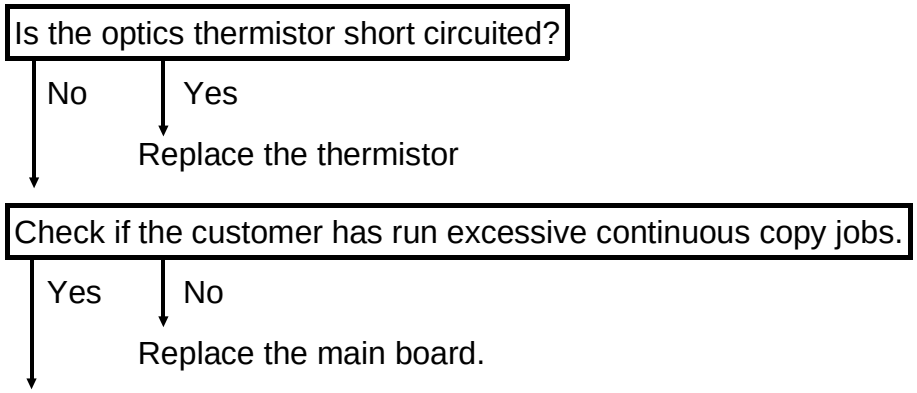
The optics thermistor has detected a high temperature condition as shown below. Copying is disabled until the temperature drops to the starting temperature.

	110V machine	115V machine	220V machine
Stopping temp.	46°C	50°C	48°C
Starting temp.	41°C	45°C	43°C

- Possible Case -

- Optics thermistor short circuit.
- Excessive continuous copy jobs

- Action -



Notify the customer that the machine may stop when excessive continuous copy jobs are performed.

NOTE: The same optics cooling fan as for the FT3213 copier can be installed on this machine as an optional service part. (See section 5 for the installation procedure.)

3. DEFECTIVE COMPONENT TABLES

3.1 DEFECTIVE SENSOR TABLE

Component	Condition	Symptom
Scanner Home Position Sensor (S1)	Stays HIGH (CN103-11)	SC code (E22) is displayed.
	Stays LOW (CN103-11)	SC code (E21) is displayed.
Lens Home Position Sensor (S2) (FT3213 copier only)	Stays HIGH (CN103-8)	SC code (E29) is displayed.
	Stays LOW (CN103-8)	SC code (E28) is displayed.
4th/5th Mirror Home Position Sensor (S3) (FT3213 copier only)	Stays HIGH (CN102-2)	SC code (E2B) is displayed.
	Stays LOW (CN102-2)	SC code (E2A) is displayed.
Registration Sensor (S4)	Stays HIGH (CN117-2)	The "Check Paper Path" indicator and "J1" indicator light when a copy is made.
	Stays LOW (CN117-2)	The "Check Paper Path" indicator and "J1" indicator light when the main switch is turned on.
Exit Sensor (S5)	Stays HIGH (CN116-2)	The "Check Paper Path" indicator and "J2" indicator light when a copy is made.
	Stays LOW (CN116-2)	The "Check Paper Path" indicator and "J2" indicator light when the main switch is turned on.
Relay Sensor (S6)	Stays HIGH (CN117-6)	The "PE" indicator lights when a copy is made.
	Stays LOW (CN117-6)	The "J1" indicator stays on when the main switch is turned on although there is no copy paper on the by-pass feed table.
Image Density Sensor (ID Sensor) (S7)	Stays HIGH (CN112-1)	The CPU detects an ID sensor abnormal condition. The ADS or Manual Image Density indicators start blinking.
	Stays LOW (CN112-1)	

3.2 DEFECTIVE SWITCHES OR OTHER ELECTRICAL COMPONENTS

Component	Condition	Symptom
Main Switch (SW1)	OPEN	The copier does not turn on.
	SHORT	The copier does not turn off.
Front Cover Safety Switch (SW2)	OPEN	The copier does not turn on.
	SHORT	The copier does not turn off when the front or exit cover is opened.
Paper Tray Switch (SW3)	OPEN	The Start key stays red even when the 1st paper tray is closed.
	SHORT	The Start key stays green even when the 1st paper tray is open, and the "J1" indicator lights after the Start key is pressed.
Exposure Lamp (L1)	OPEN	SC code (E11) is displayed.
Fusing Lamp (L2)	OPEN	SC code (E52) is displayed.
Fusing Thermistor (TH1)	OPEN	SC code (E55) is displayed.
	SHORT	SC code (E53) is displayed.
Fusing Thermoswitch (TS)	OPEN	SC code (E52) is displayed.
Optics Thermofuse (TF)	OPEN	SC code (E11) is displayed.
Optics Thermistor (TH2)	OPEN	SC code (E40) is displayed.
	SHORT	The Energy Saver Function key blinks.

3.3 OPEN FUSE & CIRCUIT BREAKER TABLE

Component	Circuit	Symptom
FU201 (250 V/2 A) (dc power supply board)	+5 V (VC) power supply	The copier does not turn on even when the main switch is turned on.
FU202 (250 V/4 A) (dc power supply board)	+24 V (VA) power supply	The copier displays E22 on the operation panel.
FU401 (125 V/15 A) (ac drive board) ... 115 V machine only	Front door safety	The copier does not turn on even when the main switch is turned on.
FU402 (250 V/6.3 A) (ac drive board) ... 220~230 V/240 V machine only	Front door safety	The copier does not turn on even when the main switch is turned on.
F1 (250 V/2 A) (DF main board)	DC power supply for the DF	The DF does not turn on even when the main switch is turned on.
FU101 (250 V/2 A) (Between CN418 on the ac drive board and CN1 of the DF connector) ... 220~230 V/240 V machine only	AC power supply for the DF	The DF does not turn on even when the main switch is turned on.
Circuit Breaker ... 220~230 V/240 V machine only	AC power supply	The copier does not turn on even when the main switch is turned on.

DOCUMENT FEEDER

A296

1. SPECIFICATIONS

Rev. 1/95

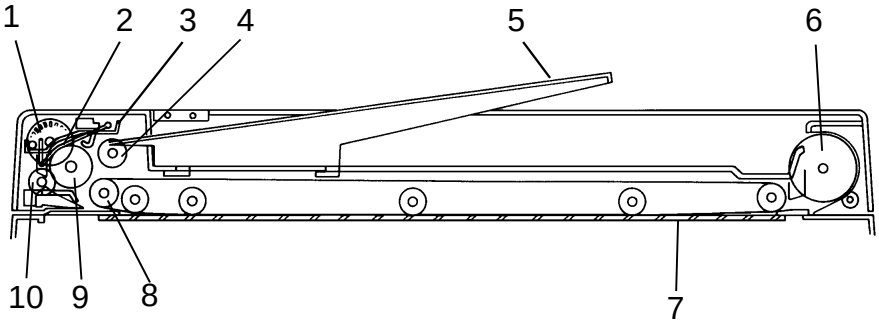
Original Size:	Maximum:	A3 or 11" x 17"
	Minimum:	A5 Lengthwise or 5 1/2" x 8 1/2"
Original Weight:	53 to 105 g/m^2 (14 to 28 lb)	
Original Feed:	Automatic Feed - ADF mode	
Original Tray Capacity:	30 sheets - 80 g/m^2 (20 lb)	
Original Set:	Face up - First sheet on top	
Original Transport:	One flat belt	
Copying Speed:	13 copies/minute (A4 lengthwise or 8 1/2" x 11" lengthwise)	
Power Consumption:	35 W	
Dimensions (W x D x H):	590 x 443 x 100 mm (23.3" x 17.5" x 4.0")	
Weight:	Approximately 7 kg (15.5 lb)	

- Specifications are subject to change without notice.
- The document feeder (DF40) can only be installed on the FT3213.
- Only DF40 document feeders from S/N A296-4-05-0001 have the necessary accessory parts for installation on to the FT3213. These accessory parts include (1) ADF Interface Bracket Assy. P/N A3650661 & (2) Shoulder screws P/N A0771361.

NOTE: PM items for the document feeder can be found on copier PM table page 4-30.

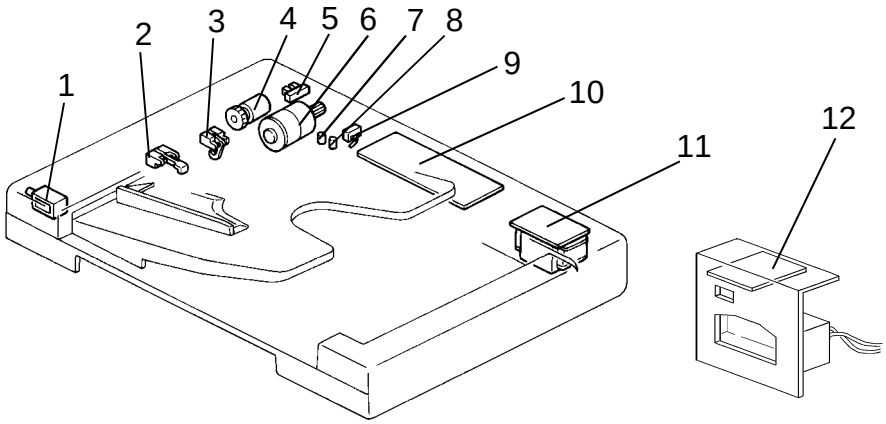
2. COMPONENT LAYOUT

2.1 MECHANICAL COMPONENTS



1. Pulse Generator Disk
2. Friction Belt
3. Pick-up Lever
4. Pick-up Roller
5. Original Table
6. Exit Roller
7. Transport Belt
8. Transport Belt Roller
9. Feed Roller
10. Relay Roller

2.2 ELECTRICAL COMPONENTS



1. Pick-up Solenoid
2. Registration Sensor
3. Original Set Sensor
4. Feed Clutch
5. Pulse Generator Sensor
6. DF Motor
7. Insert Original Indicator
8. Original Misfeed Indicator
9. Lift Switch
10. DF Main Board
11. DF Transformer
12. DF Interface Board

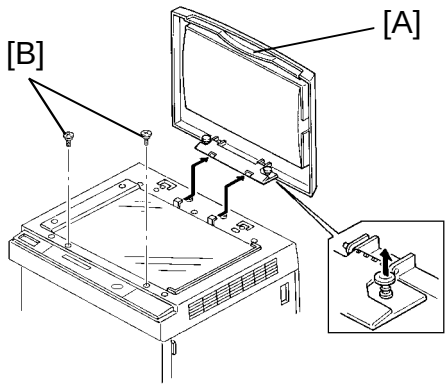
3. ELECTRICAL COMPONENT DESCRIPTIONS

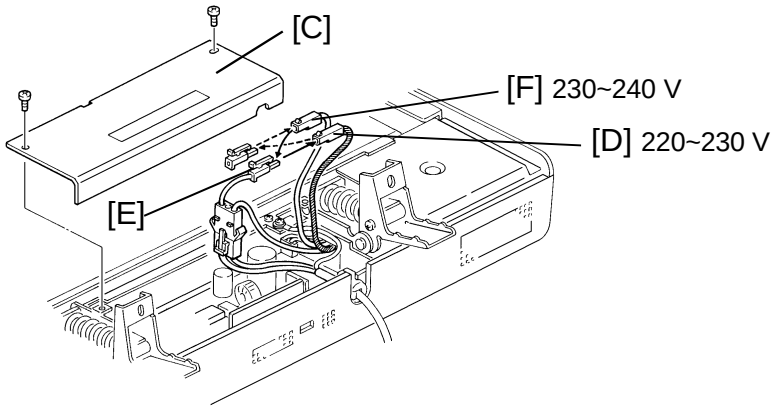
SYMBOL	NAME	FUNCTION	LOCATION
Motor			
M1	DF	Drives all the document feeder components.	6
Solenoid			
SOL1	Pick-up Solenoid	Energizes to press the pick-up lever against the stack of originals in preparation for original feed-in.	1
Clutch			
CL1	Feed Clutch	Turns on to transmit main motor rotation to the feed roller.	4
Switch			
SW1	Lift Switch	Informs the CPU when the DF is lifted and also serves as the misfeed reset switch for the DF.	9
Sensors			
S1	Pulse Generator Sensor	Supplies timing pulse to the DF main board.	5
S2	Original Set Sensor	Informs the copier CPU that originals have been placed and causes the Insert Original indicator to go out.	3
S3	Registration Sensor	Sets original stop timing and checks for original misfeeds.	2
Printed Circuit Board			
PCB1	DF Main Board	Controls all DF functions.	10
PCB2	DF Interface Board	Interfaces between the copier main board and the DF.	12
Transformer			
TR1	DF Transformer	Steps down the wall voltage to 25 volts ac.	11
LEDs			
LED1	Original Misfeed Indicator	Turns on when an original is misdeed.	8
LED2	Insert Original Indicator	Turns off when the originals are inserted into the original table.	7

4. INSTALLATION PROCEDURE

Rev. 1/95

NOTE: 1) This procedure is for the FT3213 copier only.



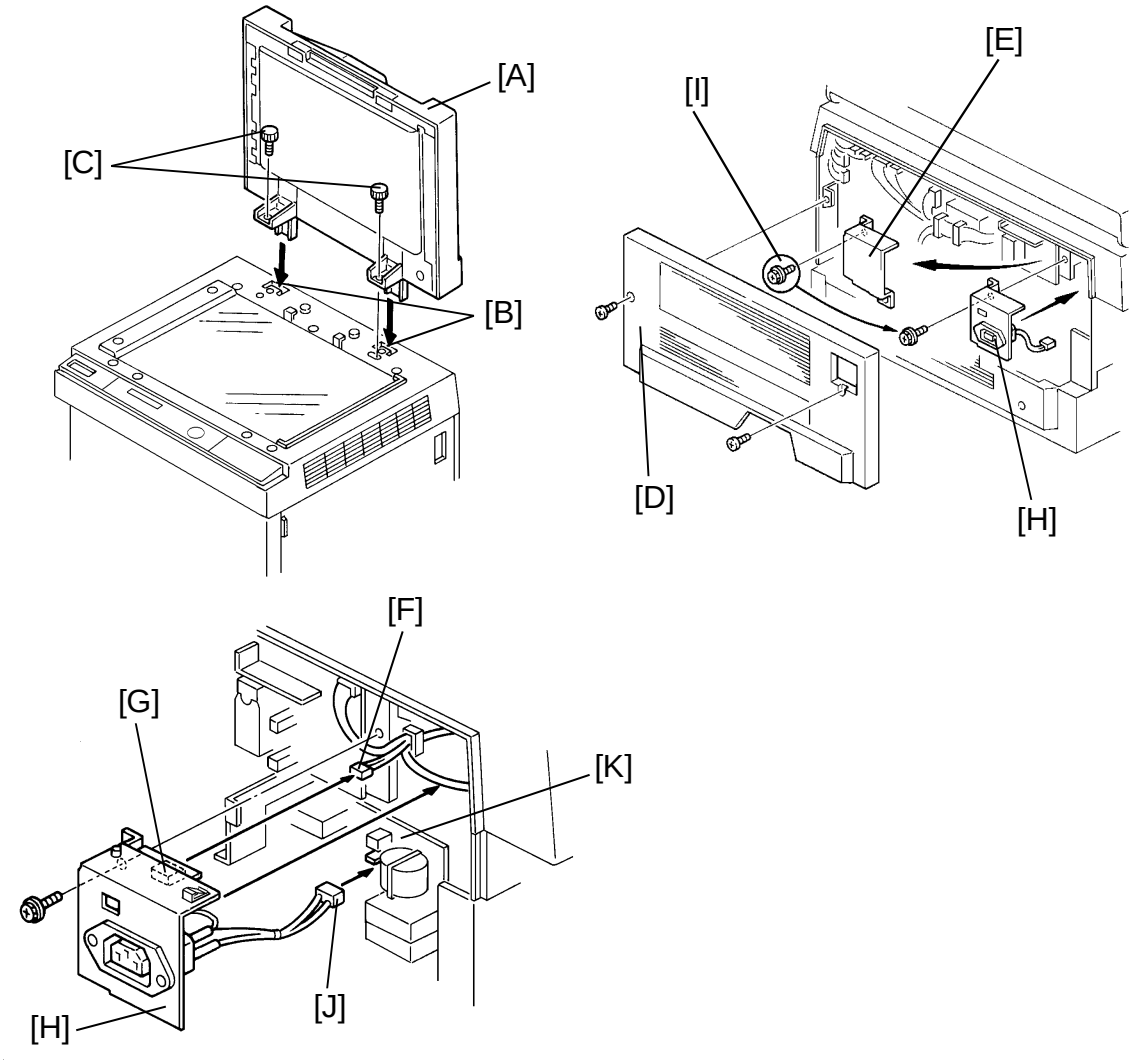


CAUTION: When installing the DF, make sure that the copier is unplugged.

1. Remove the platen cover [A] from the copier.
2. Replace the 2 screws with the 2 stud screws [B].
3. Remove the strips of tape from the DF.

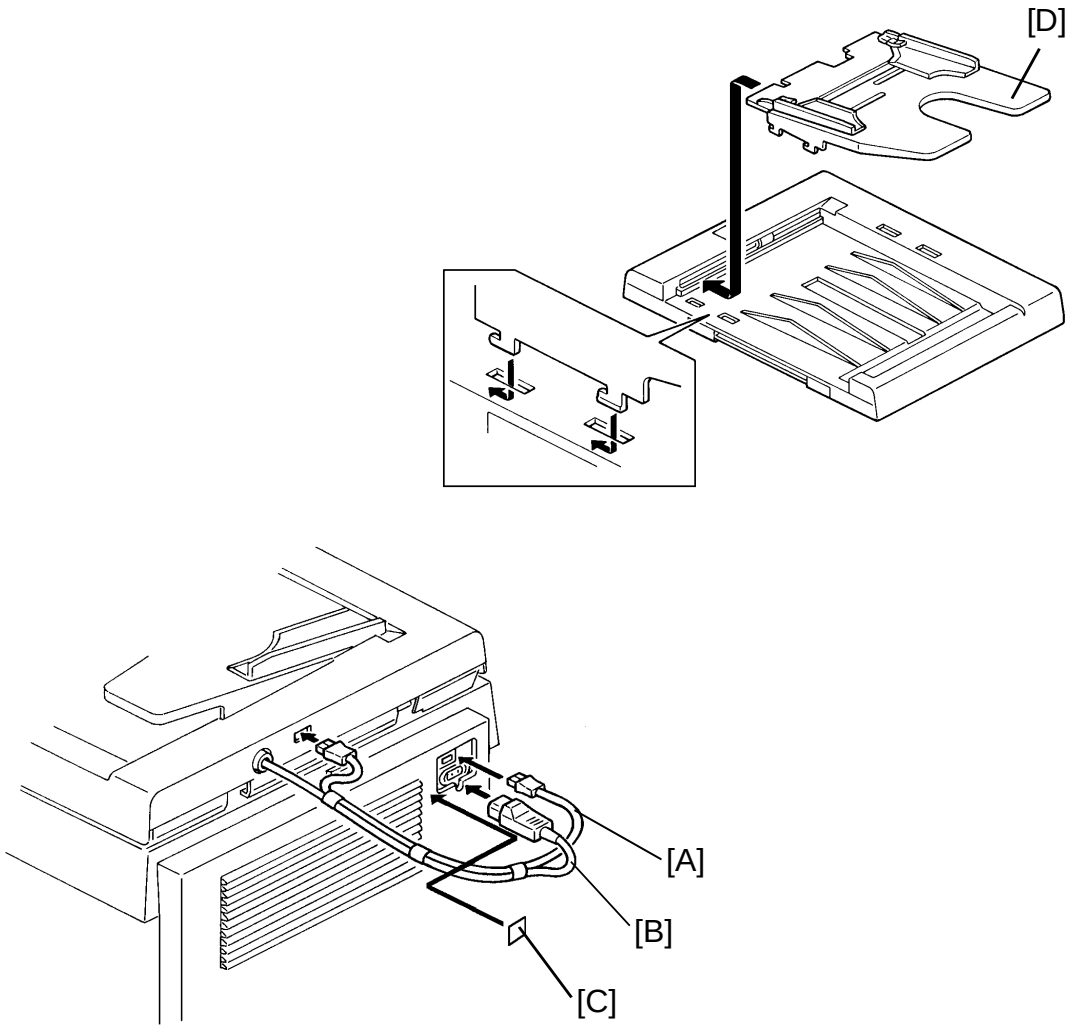
CAUTION: This procedure (step 4) must be done only in 240 volt areas

4. Perform the conversion from 220~230 V to 240 V as follows:
   1) Remove the main board cover [C] (2 screws).
   2) Disconnect the connector for 220~230 V [D] (Black Wire) from the ac harness connector [E] and reconnect the connector for 240 V [F] (White Wire) to the ac harness connector.
   3) Reinstall the cover.

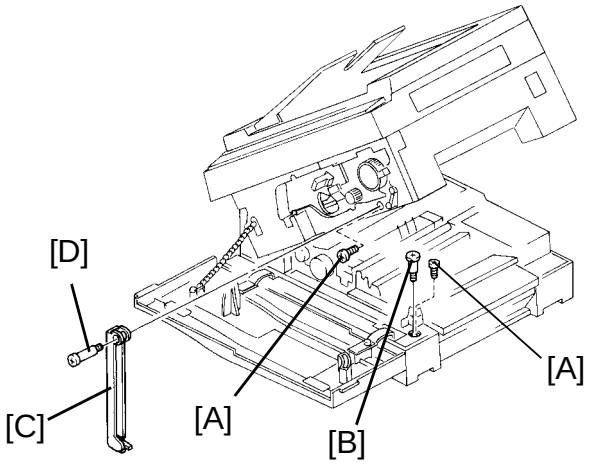


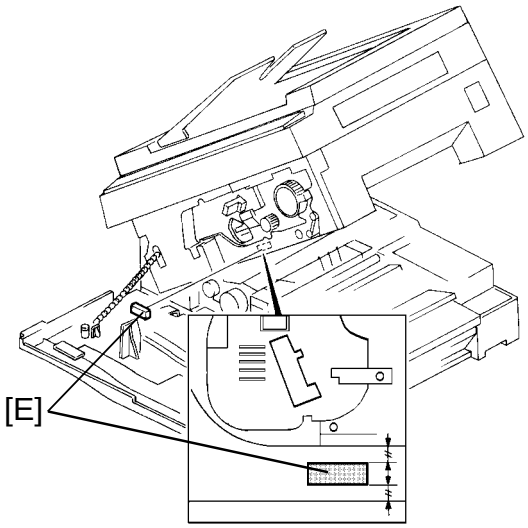
5. Insert the DF [A] into the holes [B] in the copier upper cover.
6. Secure the DF to the copier (2 thumb screws [C]).
7. Remove the upper rear cover [D] (2 screws).
8. Remove the ADF bracket [E] (1 screw and 1 clamp).
9. Locate the 4P connector [F] and connect it to the ADF interface board [G], then fix the ADF interface unit [H] to the copier (1 screw) while securing the harnesses through the wire clamp.

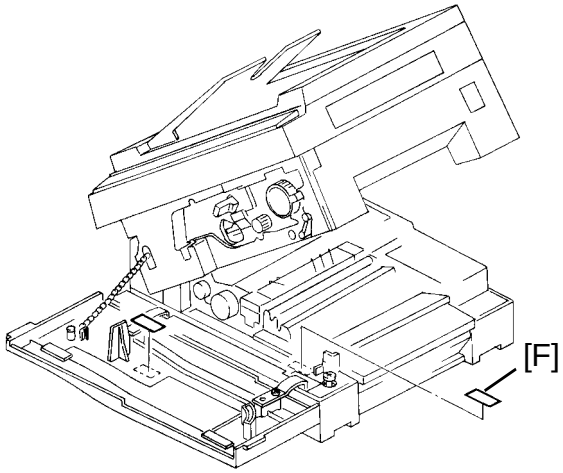
   NOTE: Use the screw that secured the ADF bracket [I].
10. Plug in the connector [J] (3P/Black) to CN418 on the ac drive board [K].



11. Reinstall the upper rear cover.
12. Plug the optics fiber cable [A] into the DF and the copier.
13. Plug the power supply cord [B] of the DF into the outlet in the copier rear cover.
14. Attach the voltage reference decal [C].
15. Install the original table [D].



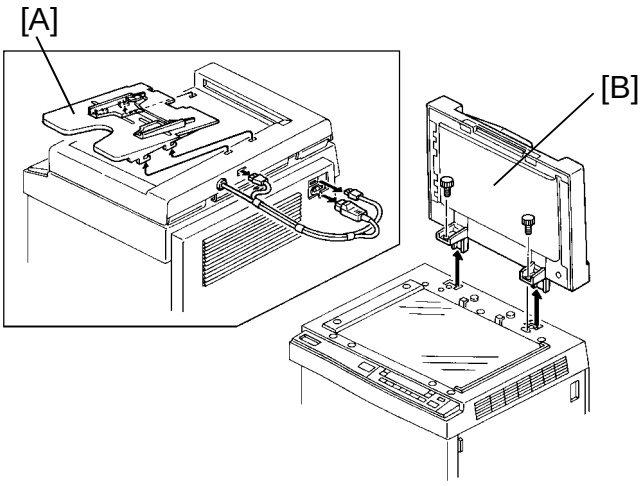


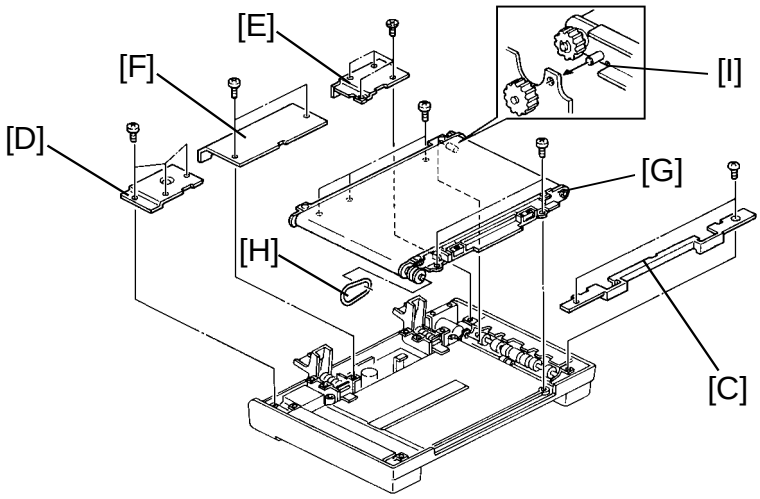


16. Open the front cover.
17. Lift the upper unit.
18. Remove 2 screws [A].
19. Tighten the shorter stepped screw [B].
20. Install the upper unit stand [C]
    (1 longer stepped screw [D]).
21. Attach the magnet [E].
22. Attach the decal [F].
23. Close the upper unit and the front cover.
24. Check the operation of the DF.
25. Instruct key operators how to use the upper unit stand.

5. REPLACEMENT AND ADJUSTMENT

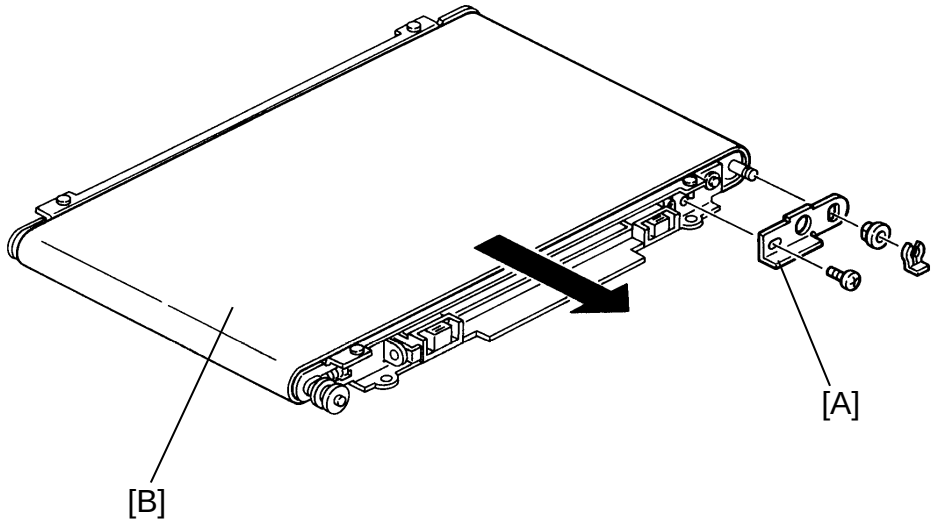
5.1 TRANSPORT BELT REPLACEMENT





1. Turn off the main switch.
2. Remove the original table [A].
3. Remove the DF [B] from the copier (2 knob screws, 1 power supply cord and 1 optics harness).
4. Remove the grip guide [C] (2 screws).
5. Remove the transformer cover [D] (3 screws), DF motor cover [E] (4 screws) and main board cover [F] (2 screws).
6. Remove the transport belt assembly [G] (5 screws and 1 drive belt [H]).

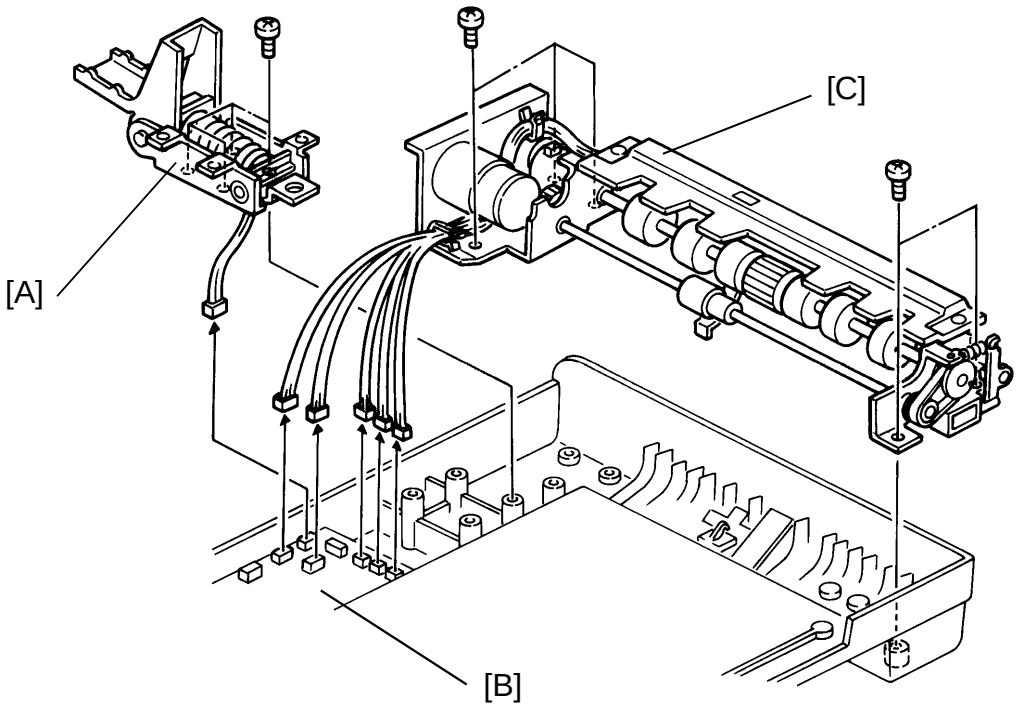
   NOTE: When installing the transport belt assembly, make sure that the positioning pin [I] fits into the DF frame.



7. Remove the transport roller holder [A] (1 screw, 1 snap ring and 1 bushing).
8. Pull out the transport belt [B].

   NOTE: After reinstalling the transport belt, make sure that the bushings of the transport rollers set correctly and the transport belt turns smoothly.

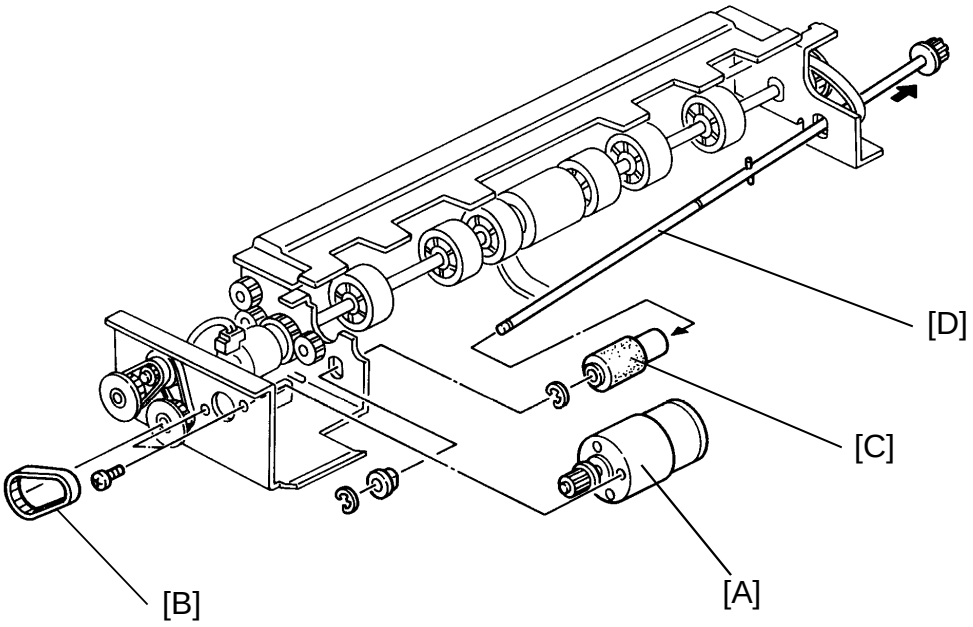
5.2 FEED-IN UNIT REMOVAL



1. Turn off the main switch.
2. Remove the transport belt assembly. (See Transport Belt Replacement.)
3. Remove the left hinge bracket [A] (4 screws and 1 connector).
4. Disconnect five connectors from the main board [B] (CN111, CN113, CN115, CN116 and CN117).
5. Remove the feed-in unit [C] (5 screws).

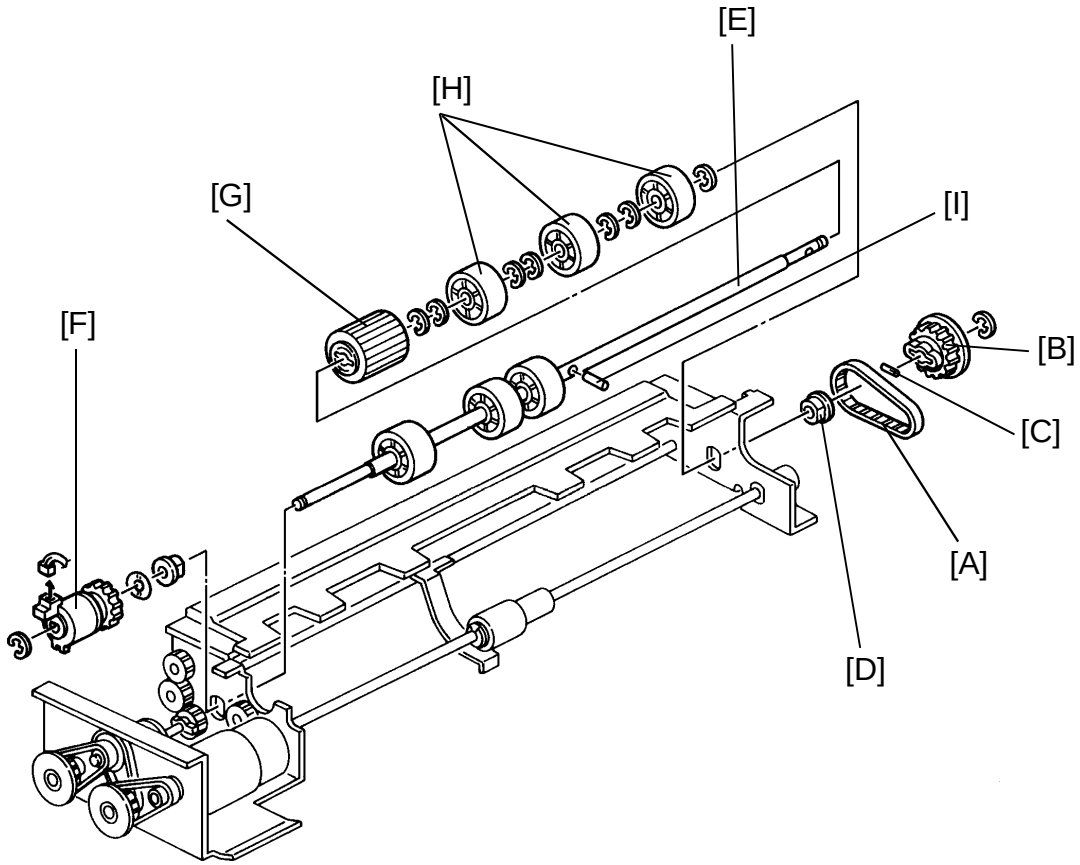
   NOTE: When reinstalling the feed-in unit, the harness must be positioned underneath the right hinge bracket.

5.3 PICK-UP ROLLER REPLACEMENT



1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Remove the DF motor [A] (2 screws and 1 timing belt [B]).
4. Remove the pick-up roller [C] (2 E-rings and 1 bushing) from the shaft [D].

5.4 FEED ROLLER REPLACEMENT

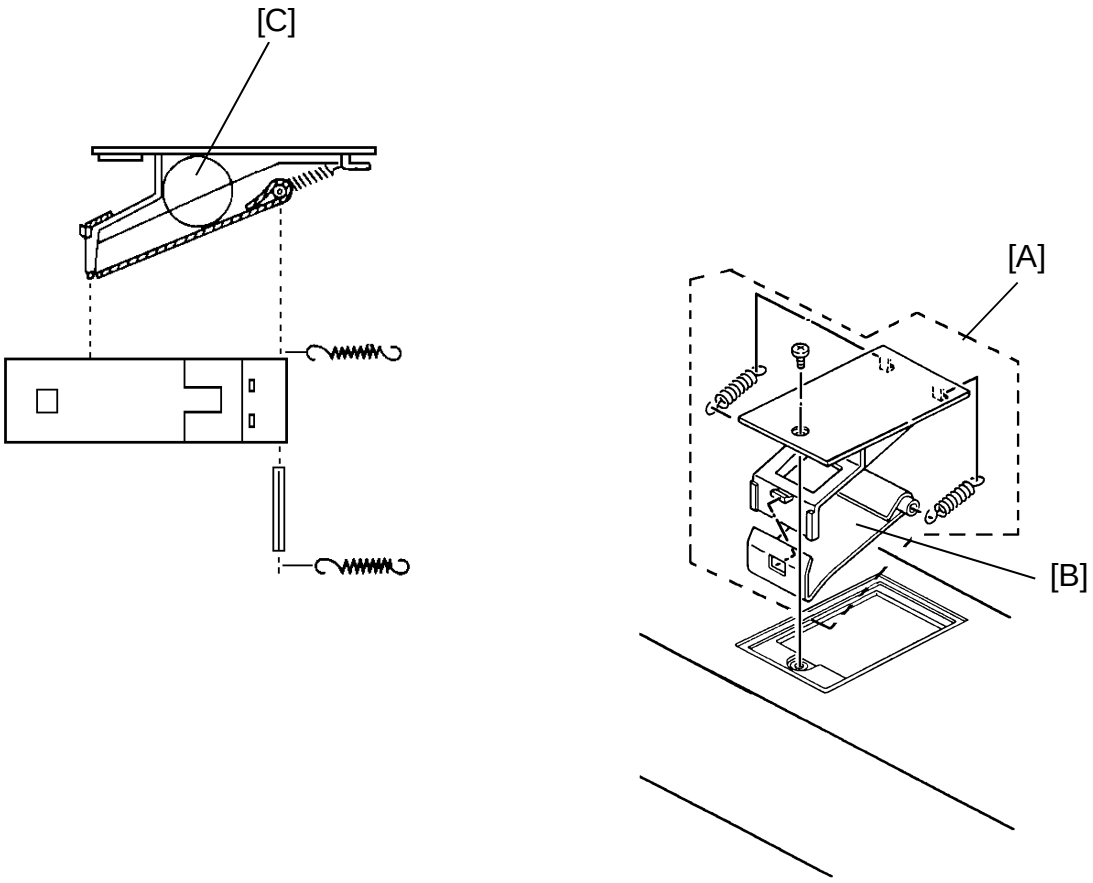


1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Remove the feed roller timing belt [A], feed roller gear [B] (1 E-ring and 1 spring pin [C]) and 1 bushing [D].

   NOTE: Be careful not to lose the spring pin.
4. Slide the feed roller shaft [E] towards the front and remove the feed clutch [F] (1 E-ring and 1 connector).
5. Take out the feed roller shaft (1 spacer and 1 bushing ----- from the rear side).
6. Remove the feed roller [G] from the shaft (3 idler rollers [H], 7 E-rings and 1 spring pin [I]).

   NOTE: Be careful not to lose the spring pin.

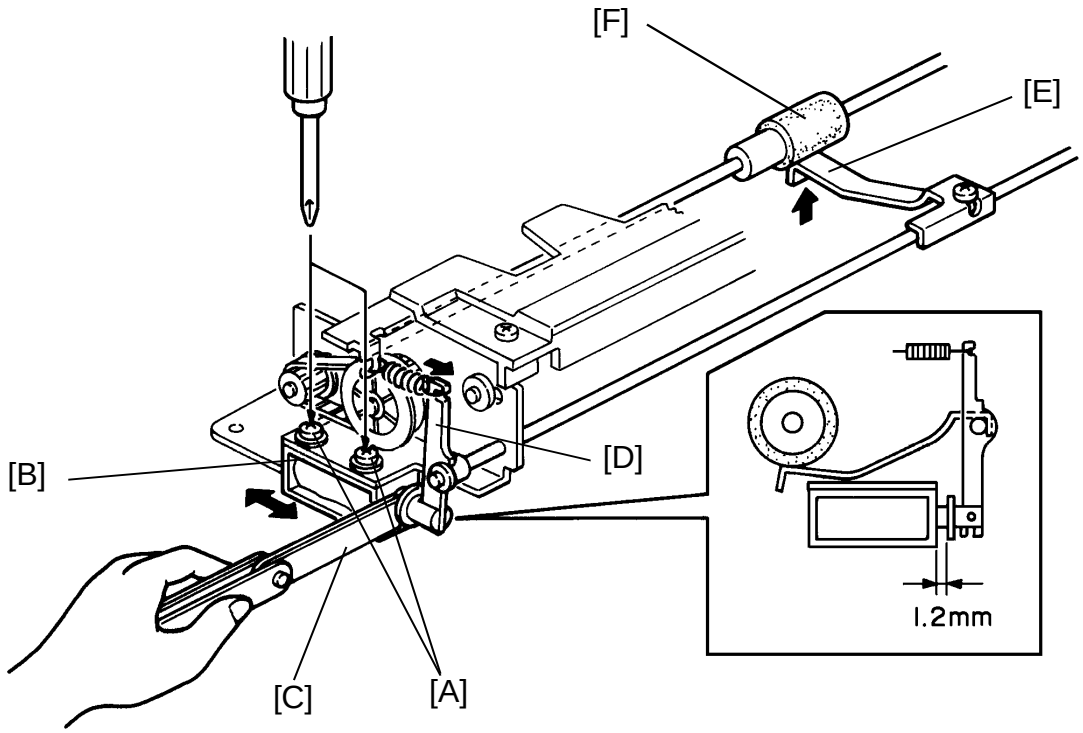
5.5 FRICTION BELT REPLACEMENT



1. Turn off the main switch.
2. Remove the friction belt assembly [A] (1 screw).
3. Remove the friction belt [B] (2 springs, 1 pin).

NOTE: When installing the friction belt assembly, make sure the feed roller [C] is set in the correct position. (See the illustration.)

5.6 PICK-UP SOLENOID ADJUSTMENT



1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Loosen two screws [A] securing the pick-up solenoid [B].
4. Place a 1.2 mm thickness gauge [C] between the plunger and the solenoid.
5. Turn the solenoid lever [D] clockwise until the plunger touches the thickness gauge. Just at this point, tighten two screws.
6. Make sure that the pick-up lever [E] is touching the pick-up roller [F] when the plunger is pushed. If not, repeat steps 3 to 5.
7. Reassemble the DF.
8. Turn on the main switch and check the original feed-in operation.

A202/A203
COPIER

SERVICE MANUAL

The A202 copier is based on the A151 copier.
The A203 copier is based on the A152 copier.

Only the differences from the A151/A152 copier are described in the following pages. Refer to the A151/A152 copier's service manual for additional information. A model cross reference table can be found in the specifications section of this manual.

MAJOR DIFFERENCES BETWEEN THE A202/A203 AND A151/A152.

The following table lists the major differences between the A202/A203 series and the A151/A152 series. A "Model Cross Reference Table" can be found in the Specifications Section of the service manual.

No.	Item	A202/A203	A151/A152
Process Control			
1	Grid Voltage for Image Density Control	Depends on the Standard image density grid voltage and the auto image density factor.	Depends on the factors shown on the left, and also the drum residual voltage (V_R) detection factor.
2	Grid Voltage for Toner	Depends on the standard ID sensor grid voltage.	Depends on the standard ID sensor grid voltage and the drum wear correction factor.
3	Drum Residual Voltage (V_R) Detection and Correction	The drum residual voltage (V_R) detection and drum residual voltage (V_R) correction have been eliminated.	—
4	Drum Wear Correction	The drum wear correction has been eliminated,	—
Optics			
1	Optics Cooling Fan	The optics cooling fan is installed for both A202 and A203 copiers.	The optics cooling fan is installed on the A152 copier only.
Development			
1	Development Bias Circuit	The bias feed back circuit is mounted inside the power pack.	The bias feed back signal is sent from the power pack to the main board to control the development bias voltage.
Toner Supply			
1	Toner Supply Mechanism	A toner supply motor is used to add toner to the development unit.	A toner supply clutch is used to add toner to the development unit.

No.	Item	A202/A203	A151/A152
Electrical Component			
1	Fusing Triac	The fusing triac is built into the ac drive board for all models.	In the 115V machines, the fusing triac is a separate electrical component.
Power Distribution			
1	Quenching Lamp	The quenching lamp receives dc power from the main board.	The quenching lamp receives ac power from the ac drive board.
Paper Feed			
1	Paper Length Detection for Paper Tray Unit	The paper length is measured by the registration sensor during every first copy.	The paper length is measured by the registration sensor only during the first copy after some particular actions are performed.
Installation			
1	Document Feeder (A662)	The document feeder can be installed on the FT4015 (A219) as well. When installing, make sure to use the correct interface unit bracket.	-
SP Modes			
1	Display of SP Mode Number Which are Above 100	The manual ID indicator is used instead of "1" in the copy counter.	"●" is displayed instead of "1" in the copy counter.
2	Software Counters	Some software counters are eliminated due to the small capacity of the EEPROM.	The copier uses a RAM Pack for the software counters.
3	Clear All Memory Procedures	The clear all memory procedure can be performed by key operation.	The clear all memory procedure can be performed by DPS101-2 only.

A202/A203 and A151/A152 SP Mode Differences Table

1. New SP Modes for the A202/203

No.	Model Name	Comment
22	SADF Shut off Time (A203 copier only)	
49	Fusing Temperature Adjustment	Same as A151/A152
59	Optics Temperature Display	
71	VL Correction Selection	
77	Auto Shut Off (Energy Star) On/Off	
80	Horizontal Edge Margin Width Adjustment	
81	Factory Initialization	
97	Service Call (E52, E53, E55)	A151/A152 clears the E5 conditions by turning off on the DPS101-1.
111	Total Service Calls	Same as the A151/A152

2. Eliminate SP Modes compared to the A151/A152

No.	Model Name	Comment
12	220 ~ 230 V/240 Conversion	The ac drive board is designed for 230V
17	Open	Can not be entered.
39	Exposure Lamp ON	Does not perform this program at the factory.
67	VR Ratio Display	Vr correction not performed.
68	VR Forced Detection	Vr correction not performed.
79	Fusing Temperature Adjustment	Same as A202/A203 SP49.
87	PM Interval Setting	Eliminated due to small capacity of EEPROM.
88	PM Counter Display	Eliminated due to small capacity of EEPROM.
89	PM Counter Clear	Eliminated due to small capacity of EEPROM.
91	Optics Cooling Fan Operation (A151 copier only)	No need for this function.
93	Maximum Copy Quantity	Eliminated due to small capacity of EEPROM.
111	Number of Misfeeds by Location	Eliminated due to small capacity of EEPROM.
120	Total Service Calls	Same as A202/A203 SP111
121	Optics Section Service Calls	
122	Exposure Lamp Service Calls	Eliminated due to small capacity of EEPROM.
123	Open	Can not be entered.
124	Fusing Section Service Calls	Eliminated due to small capacity of EEPROM.
125	DF Communication Service Calls	Eliminated due to small capacity of EEPROM.

MAJOR UNIQUE PARTS FOR A202/A203 SERIES
(Compared with the A151/A152 series)

PM Parts

Part Number	Description
A2032632	PICK UP ROLLER ASS'Y

Electrical Parts

Part Number	Description
A2031166	BOTTLE DRIVE MOTOR
A2031169	FAN MOTOR - 24 V 3.6 W
A2031183	MAIN MOTOR - AC 220V 120 W
A2031184	MAIN MOTOR - AC 115V 120 W
A2031185	MAIN MOTOR - AC 220V 120 W
A2021423	OPERATION PANEL ASS'Y - LT
A2021423	OPERATION PANEL ASS'Y - LT
A2021426	OPERATION PANEL ASS'Y - A4
A2031426	OPERATION PANEL ASS'Y - A4
A2021427	OPERATION PANEL ASS'Y
A2031427	OPERATION PANEL ASS'Y
A2021433	OPERATION PANEL ASS'Y - LT
A2031433	OPERATION PANEL ASS'Y - LT
A2031735	FAN MOTOR - 24 V 3.6 W
A2034131	THERMOSTAT- 170°C 120 V 15 A
A2025103	MAIN CONTROL BOARD
A2035103	MAIN CONTROL BOARD
A2025106	MAIN CONTROL BOARD
A2035106	MAIN CONTROL BOARD
A2025108	IC - UVEPROM 512 k x 8 150NS
A2035108	IC - UVEPROM 512 k x 8 150NS
A2035650	POWER PACK- TD
A2035653	POWER PACK- CBG
A2035655	DC DRIVE BOARD - 115 V
A2035657	DC DRIVE BOARD - 230 V
A2035660	AC DRIVE BOARD - 115 V
A2035670	AC DRIVE BOARD- 230 V
—	TONER SUPPLY CLUTCH (eliminated)

MAJOR UNIQUE PARTS FOR A202/A203 SERIES
(Compared with the A151/A152 series)

PM Parts

Parts Number	Description
A4971170	Friction Belt

Electrical Parts

Parts Number	Description
A6625010	Main Control Board

⚠ IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that the optional anti-condensation heaters are supplied with electrical voltage even if the main switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.
6. When the development unit, cleaning unit, drum unit, or the DF is removed from the machine, the upper unit becomes lighter. If the upper unit is released under this condition, it tends to open very abruptly. The service engineer might be injured if he is leaning over the machine at this time. Also, the machine might move due to the shock of the upper unit opening abruptly. To avoid possible injury or machine damage, hold the upper unit firmly when opening the unloaded upper unit.
7. Due to variation in the tolerance of the torsion springs, the upper unit cannot be held at an angle of 16 degrees by itself when the DF is installed. To avoid possible injury, always use the upper unit stand to keep the upper unit open.

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filter installed.
2. Always replace the ozone filter at 80K copy intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on the specific models.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate the toner cartridge or the used toner. Toner dust may ignite suddenly when exposed to open flame.
2. Dispose of used toner, developer, and organic photoconductors according to local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.

A202/A203

SERVICE MANUAL

1. SPECIFICATIONS

NOTE: Items marked with an ✻ are different from the A151 and A152 copiers.

Configuration:	Desk top
Copy Process:	Dry electrostatic transfer system
Original Type:	Sheet/Book
Original Alignment:	Left center
Original Size:	Maximum: A3/11" x 17" (lengthwise) - A203 copier B4/10" x 14" (lengthwise) - A202 copier
Copy Paper Size:	Maximum: B4/10" x 14" (lengthwise) Minimum: Paper Tray: A5/5 1/2" x 8 1/2" (lengthwise) Bypass Feed: A5/5 1/2" x 8 1/2" (lengthwise)
Copy Paper Weight:	Paper tray feed – 64 to 90 g/m^2 (17 to 24 lb) Bypass feed – 52 to 105 g/m^2 (14 to 28 lb)
Reproduction Ratios:	2 Enlargement and 3 Reduction (A203 copier only)

	A4 Version	Letter Version
Enlargement	141% 122%	129% 121%
Full size	100%	100%
Reduction	93% 82% 71%	93% 74% 65%

Zoom:	From 61% to 141% in 1% steps (A203 copier only)
Copying Speed:	13 copies/minute (A4/8 1/2" x 11" lengthwise) 10 copies/minute (B4/8 1/2" x 14")
Warm-up Time:	30 seconds (at 20°C/68°F)
First Copy Time:	9 seconds (A4/8 1/2" x 11" lengthwise)
Copy Number Input:	Number keys, 1 to 99
Manual Image Density Selection:	7 steps

Automatic Reset: 1 minute standard setting; can also be set to 3 minutes or no automatic reset.

Energy Saver Function: Automatic

Paper Capacity: Paper tray – 250 sheets or less than 28 mm stack height
Bypass feed table – 1 sheet

Toner Replenishment: Cartridge exchange (320 g/cartridge)
Toner Type: Type 320 (Ricoh Corp. EDP # 887716)
Developer Type: Type 310 (Ricoh Corp EDP# 889268)

Copy Tray Capacity: 100 sheets (B4/10" x 14" or smaller)
1 sheet (OHP)

✻ Power Source: 110 V/60 Hz/15 A (for Taiwan)
115 V/60 Hz/15 A (for North America)
220 V ~ 240 V/50 Hz/8 A (for Europe)
220 V/50 Hz/8 A (for Middle East)
220 V/60 Hz/8 A (for Saudi Arabia)
220 V/50 Hz/8 A (for Asia)
Refer to the serial number plate (rating plate) to determine the power source required by the machine.

Power Consumption:

	Copier Only	**With DF**
Maximum	1.4 kVA	1.5 kVA
Warm-up	620 VA (average)	640 VA (average)
Copy cycle	810 VA (average)	860 VA (average)
Ready	160 VA (average)	180 VA (average)

✻ Noise Emission:

Sound power level (The measurements are made in accordance with ISO 7779.)

	Copier Only	**Copier with document feeder**
Copy cycle	Less than 64 dB	Less than 68 dB
Stand by	Less than 40 db	Less than 40 dB

Sound pressure level (The measurements are made in accordance with ISO 7779 at the operator position.)

	Copier Only	Copier with document feeder
Copy cycle	Less than 58 dB	Less than 62 dB

Dimensions:

	Width	Depth	Height
Copier with platen cover and copy tray	713 mm (28.1")	592 mm (23.3")	400 mm (15.7")
Copier with document feeder and copy tray	713 mm (28.1")	592 mm (23.3")	463 mm (18.2")

Weight: Copier only: 43 kg (94.8 lb)
With DF: 50 kg (110.2 lb)

Optional Equipment: (Sales items)
Document feeder (A203 copier only)
Key counter

Optional Equipment: (Service items)
Drum anti-condensation heater
Optics anti-condensation heater
Pre-transfer lamp

- Specifications are subject to change without notice.

Cross Reference Table:

Product Code	Ricoh Model Name	Savin	Gestetner/Nashau Tec.
A202	FT3513	9113	2713/2713S
A203	FT3713	9113Z	2713Z/3713
A662	DF44	DF44	DF44
A151*	FT3013	9013	2613
A152*	FT3213	9013Z	2613Z
A365*	DF40	DF for 9013	NRG F321

* Previous model

2. COPY PROCESS CONTROL

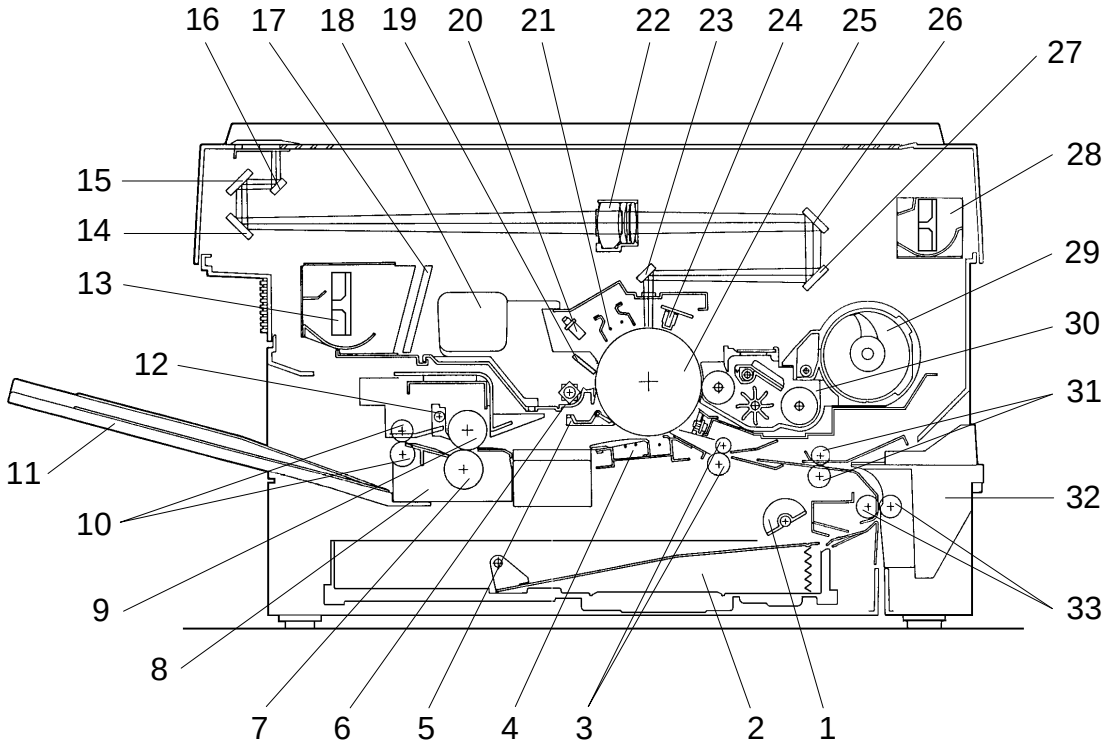
- Drum residual voltage (V_R) correction and detection have been eliminated.
- Drum wear correction has been eliminated.

	Grid Voltage	Exposure Lamp Voltage	Development Bias Voltage	Erase Lamp
Image Density Control	Standard image density grid voltage (–680 V) + [Auto image density level factor (SP34)]	[Base exposure lamp voltage (Manual or ADS mode) (SP48)] + V_L correction factor + Reproduction ratio correction factor (A203 copier only)	[Base bias voltage factor (Manual or ADS mode) (SP34)] + [Image bias voltage adjustment factor (SP37)] + Note: Base bias voltage at manual ID level 7 can be adjusted with SP50	Depends on paper size and reproduction ratio
Toner Density Detection	Standard ID sensor grid voltage (–460 V)	Same as image density control	[Depends on ID sensor bias setting (SP33)] Note: For the initial 499 copies, bias voltage is increased by –20 volts	ID sensor pattern erase (Vsg detection: Full erase)
Between Copies	0 Volts (Fixed)	Exposure lamp turns off	–160 Volts (Fixed) + [Image bias voltage adjustment factor (SP37)]	Full erase (All LEDs ON)

NOTE: The boxed items can be adjusted by SP mode.

3. MECHANICAL COMPONENT LAYOUT

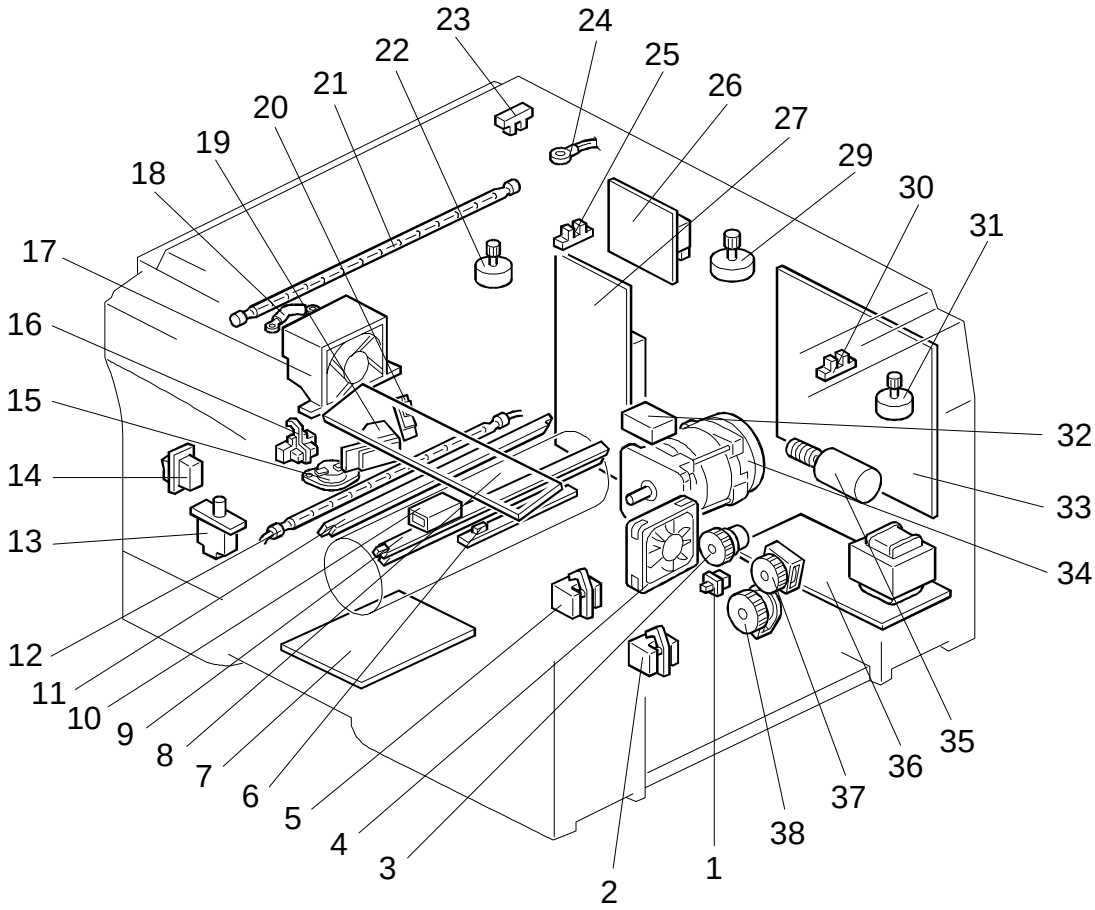
NOTE: Items marked with an ✻ are different from the A151 and A152 copiers.



1. Semicircular Feed Rollers
2. Paper Tray
3. Registration Rollers
4. Transfer and Separation Corona Unit
5. Pick-off Pawl
6. Cleaning Unit
7. Pressure Roller
8. Fusing Unit
9. Hot Roller
10. Exit Rollers
11. Copy Tray
12. Hot Roller Strippers
13. Exhaust Blower Motor
14. 3rd Mirror
15. 2nd Mirror
16. 1st Mirror
17. Ozone Filter
18. Used Toner Tank
19. Cleaning Blade
20. Quenching Lamp
21. Charge Corona Unit
22. Lens
23. 6th Mirror
24. Erase Lamp
25. Drum
26. 4th Mirror
27. 5th Mirror
- ✻ 28. Optics Cooling Fan Motor (in A202 & A203)
29. Toner Supply Unit
30. Development Unit
31. 2nd Relay Rollers
32. By-pass Feed Table
33. 1st Relay Rollers

4. ELECTRICAL COMPONENT LAYOUT

NOTE: Items marked withan ✻ are different from the A151 and A152 copiers.



1. Paper Tray Switch
2. Relay Sensor
3. Registration Clutch
✻ 4. Optics Cooling Fan Motor
5. Registration Sensor
6. Image Density Sensor
7. Power Pack-TC/SC
8. Operation Panel Board
9. Erase Lamp
10. Total Counter
11. Quenching Lamp
12. Fusing Lamp
13. Front Cover Safety Switch
14. Main Switch
15. Fusing Thermoswitch
16. Exit Sensor
17. Exhaust Blower Motor
18. Optics Thermofuse
19. Auto Image Density Sensor
20. Fusing Thermistor
21. Exposure Lamp
22. Lens Motor (A203 copier only)
23. Scanner Home Position Sensor
24. Optics Thermistor
25. Lens Home Position Sensor (A203 copier only)
26. Power Pack-CC/Grid/Bias
27. AC Drive Board
✻ 28. N/A
29. Scanner Motor
30. 4th/5th Mirror Home Position Sensor (A203 copier only)
31. 4th/5th Mirror Motor (A203 copier only)
32. Main Motor Capacitor
33. Main Board
34. Main Motor
✻ 35. Toner Supply Motor
36. DC Power Supply Board
37. Relay Roller Clutch
38. Paper Feed Clutch

NOTE: Index No. 28 is not applicable for the A202/A203 models. This item was the Fusing Traic (115V only) in the A151/A152 copiers and is not used on these models (see next page).

5. ELECTRICAL COMPONENT DESCRIPTIONS

The following motor is included as an electrical component.

Symbol	Name	Function	Index No.
M7	Toner Supply Motor	Drives the toner supply roller.	35

The following clutch and triac are not included in this copier.

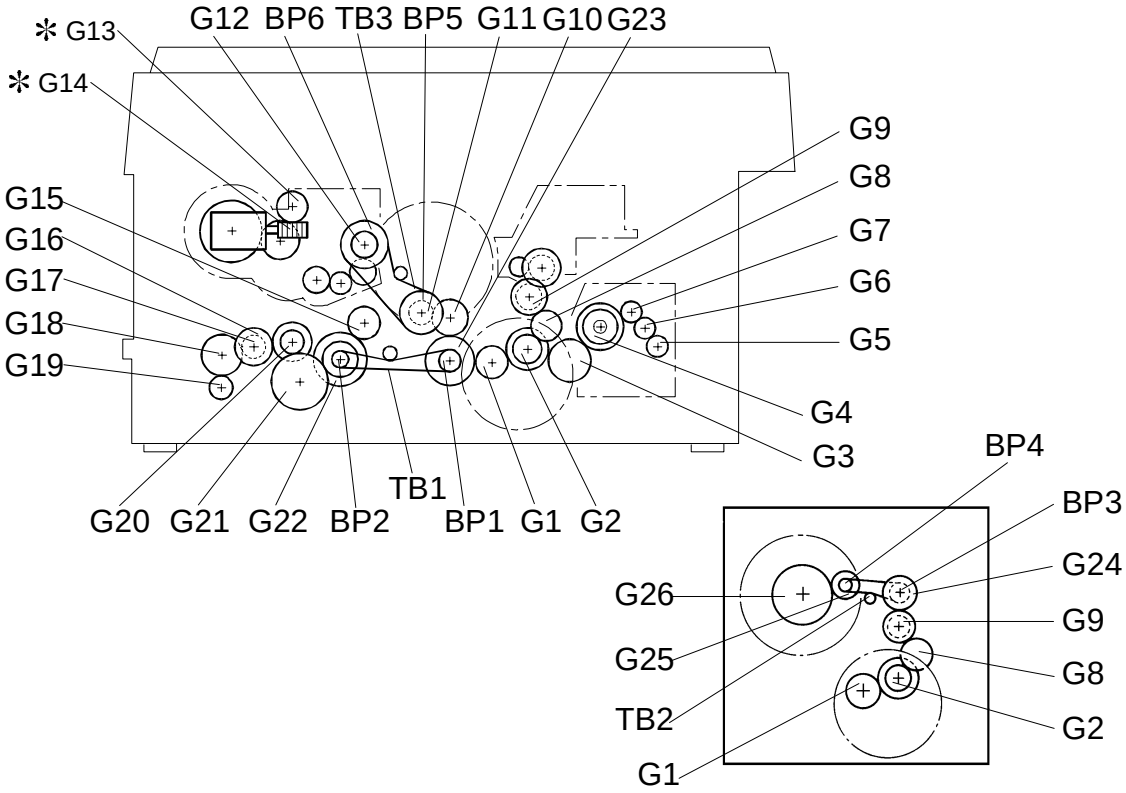
Symbol	Name	Function	Index No.
MSC1	Toner Supply Clutch	Drives the toner supply roller.	35
TR	Fusing Triac (115 V only)	Switches the fusing lamp on and off.	28

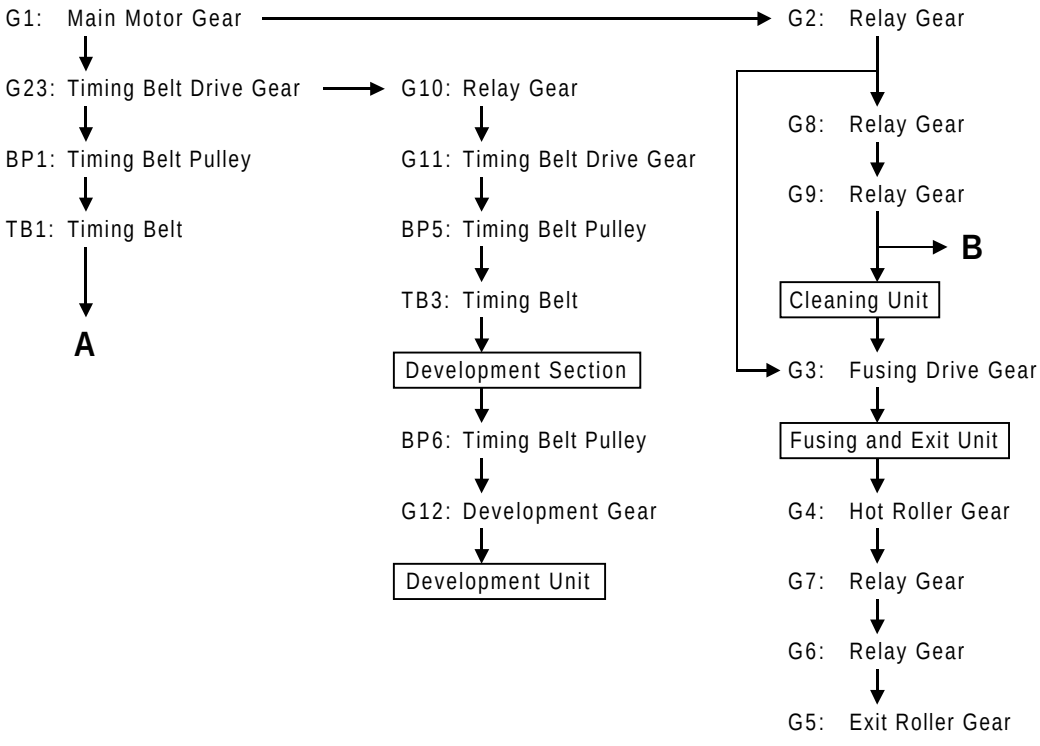
The following part has been changed.

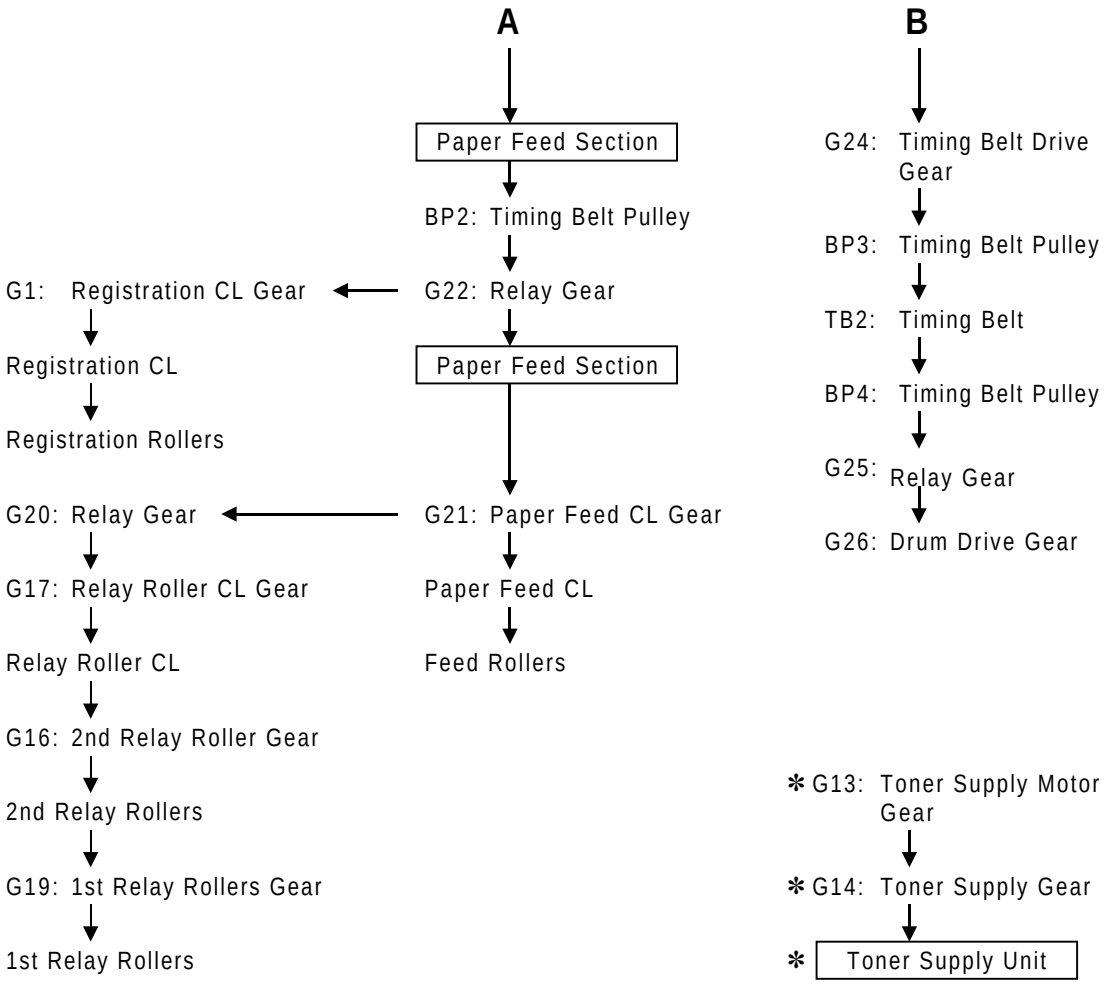
Symbol	Name	Function	Index No.
L3	Quenching Lamp	Receives dc power from the main board (the lamp in the A151/A152 received ac power from the ac drive board).	11

6. DRIVE LAYOUT

NOTE: items marked with an ✻ are different from the A151 and A152 copiers.

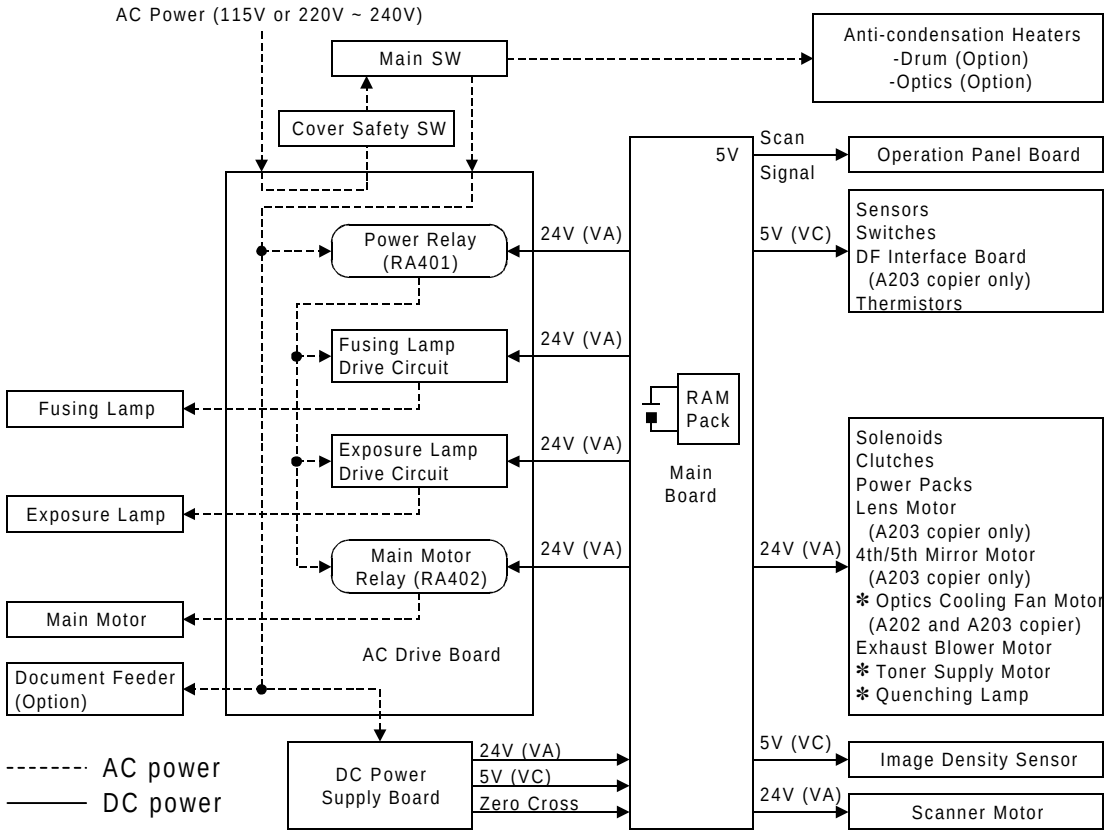





A
B
Paper Feed Section
BP2: Timing Belt Pulley
G1: Registration CL Gear
G22: Relay Gear
Registration CL
Paper Feed Section
Registration Rollers
G20: Relay Gear
G21: Paper Feed CL Gear
G17: Relay Roller CL Gear
Paper Feed CL
Relay Roller CL
Feed Rollers
G16: 2nd Relay Roller Gear
2nd Relay Rollers
G19: 1st Relay Rollers Gear
1st Relay Rollers
G24: Timing Belt Drive Gear
BP3: Timing Belt Pulley
TB2: Timing Belt
BP4: Timing Belt Pulley
G25: Relay Gear
G26: Drum Drive Gear
✻ G13: Toner Supply Motor Gear
✻ G14: Toner Supply Gear
✻ Toner Supply Unit

7. POWER DISTRIBUTION

NOTE: Items marked with an ✻ are different from the A151 and A152 copiers.



When this copier is plugged in and the main switch is turned off, ac power is supplied via the ac drive board to the optional anti-condensation heaters. When the front cover and/or the exit cover is open, the cover safety switch completely cuts off power to all ac and dc components.

When the main switch is turned on, the ac power supply to the anti-condensation heater is cut off and ac power is supplied to the ac drive board. The dc power supply board receives wall outlet ac power through the ac drive board.

The dc power supply board converts the wall outlet ac power input to +5 volts, +24 volts, and a zero cross signal, all of which are supplied to the main board.

The main board supplies dc power to all copier dc components. All sensors, switches, thermistors, and the DF interface board (option) operate on +5 volts. The operation panel operates on +5 volts supplied by the main board.

All other dc components, including the power relay (RA401) and the main motor relay (RA402), operate on +24 volts.

When the main board receives power, it activates the power relay (RA401), which then supplies ac power to the fusing lamp drive circuit and the exposure lamp drive circuit on the ac drive board. The fusing lamp drive circuit receives a trigger signal from the main board and the fusing lamp lights. The exposure lamp does not turn on until the main board sends a trigger pulse to the exposure lamp drive circuit.

When the ⏻ key is pressed, the main board energizes the main motor relay (RA402). Then, the main motor turns on.

When the main switch is turned off, power to the main board and to RA401 is cut off, and the optional drum and optics anti-condensation heaters are turned on.

8. DRUM CHARGE

8.1 GRID VOLTAGE CORRECTION

This machine does not correct drum residual voltage correction (V_R correction) or drum wear correction.

8.2 GRID VOLTAGE FOR IMAGE DENSITY CONTROL

The main board controls the grid voltage through the CC/Grid/Bias power pack. As the grid voltage for the image density control becomes less, the copy image becomes lighter, and vice versa.

The grid voltage for image density is based as follows:

Grid Voltage = Standard image density grid voltage (–680 volts [SP60 = 4])
+
Auto image density level factor (SP34)

8.2.1 Standard Image Density Grid Voltage

The standard image density grid voltage (SP60) is set at the factory and the setting is different for each machine. The setting of SP60 is printed on the SP mode data sheet located inside the inner cover of the machine.

8.2.2 Auto Image Density Level Factor (SP34)

Auto image density level	Data (SP34)	Change of grid voltage (volts)
Normal	0 *	±0
Darker	1	–40
Lighter	2	±0

* Factory setting

The grid voltage and the exposure lamp voltage are constant regardless of the output from the auto image density sensor. Only the development bias voltage varies depending on the output from the auto image density sensor.

When the auto image density level data in SP34 is set to darker, the grid voltage is changed –40 volts as shown in the above table. When it is set to lighter, the grid voltage does not change. However, the development bias voltage is corrected.

8.3 GRID VOLTAGE FOR TONER DENSITY DETECTION

The grid voltage for toner density detection is based on the standard ID sensor grid voltage.

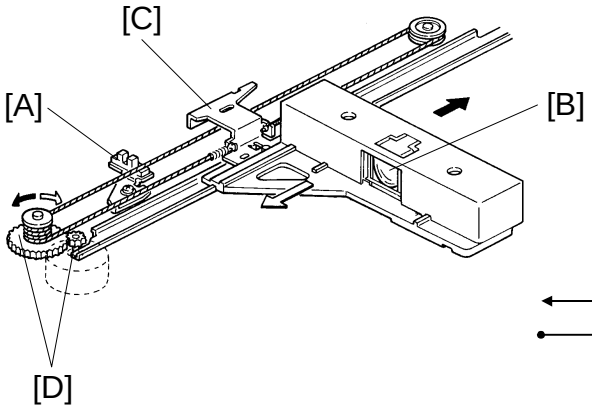
Grid voltage = Standard ID sensor grid voltage (–460 volts [SP62=4])

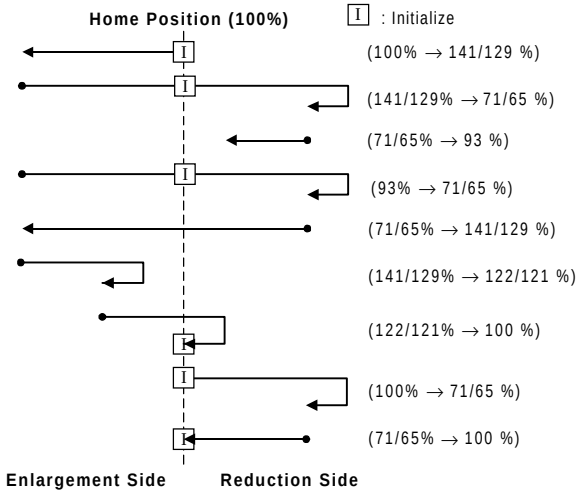
The standard ID sensor grid voltage (SP62) is set at the factory and the setting is different for each machine.

The setting of SP62 is printed on the SP mode data sheet located inside the inner cover of the machine.

9. OPTICS

9.1 LENS POSITIONING





The lens home position sensor [A] informs the main board when the lens is at the full size position (home position). The main board determines the lens stop position in reduction and enlargement modes by counting the number of steps the motor makes with reference to the lens home position. When a new reproduction ratio is selected, the lens [B] moves directly to the selected magnification position.

The lens home position is registered each time the lens starts from or passes through the lens home position sensor. As the lens moves from the enlargement side to the reduction side, the sensor registers the home position. This occurs when the actuator plate [C] enters the lens home position sensor.

A small vibration can be observed when the lens moves through the home position from the enlargement side to the reduction side because the lens is going in the wrong direction to register the home position. The lens overshoots the home position by four pulses before going back to register the home position.

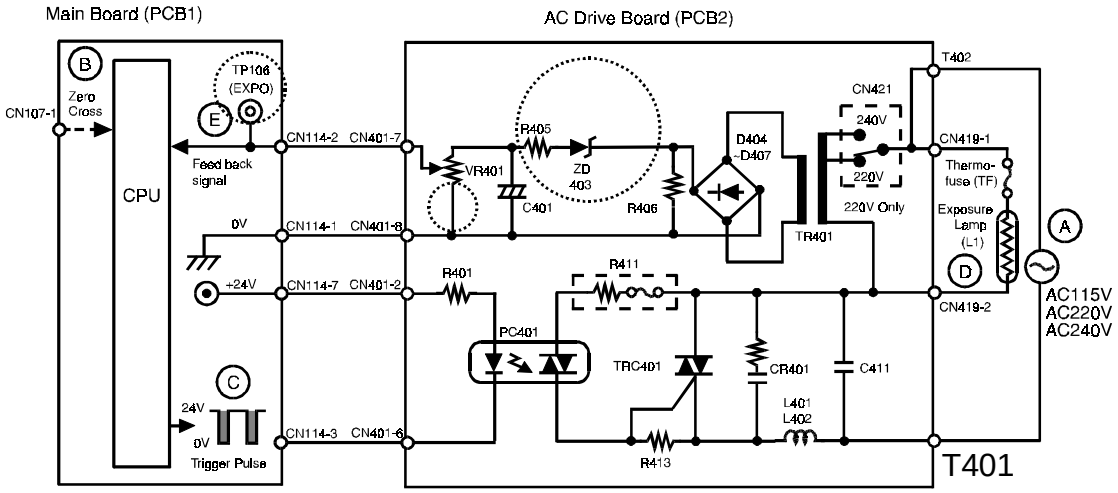
The lens always stops while moving from left to right (as viewed from the front) to minimize the error caused by mechanical play in the drive gears [D].

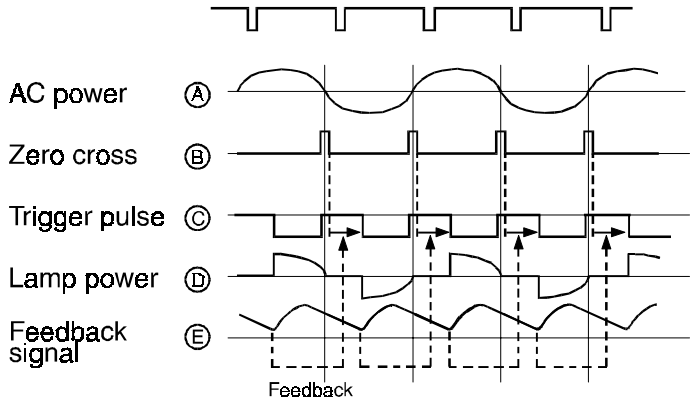
9.2 BASE LAMP VOLTAGE IN MANUAL IMAGE DENSITY MODE

SP48 sets the exposure lamp data for level 4 (Vo) of manual image density mode. A value from 100 to 170 can be selected.

9.3 EXPOSURE LAMP CONTROL CIRCUIT

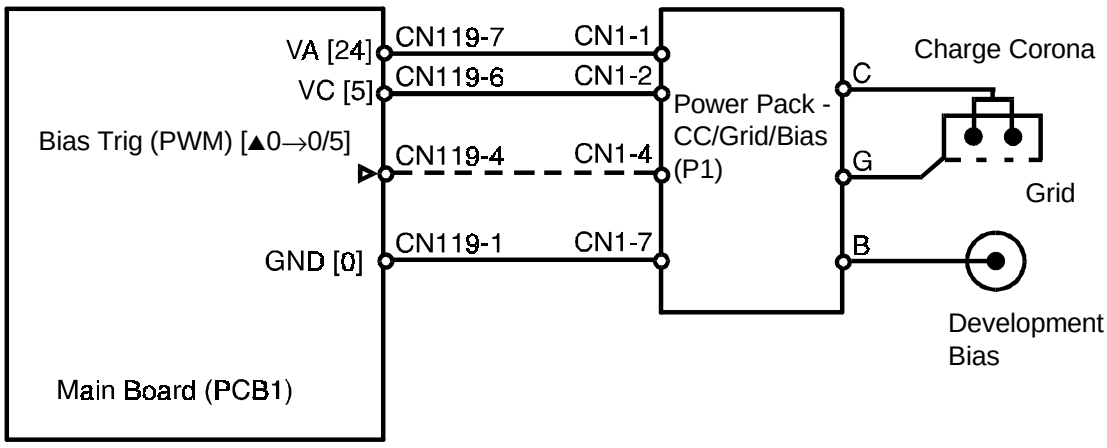
The circuit is different from the A151 and A152 copiers at the indicated locations (dashed circles).

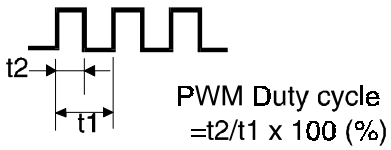




10. DEVELOPMENT

10.1 DEVELOPMENT BIAS CIRCUIT





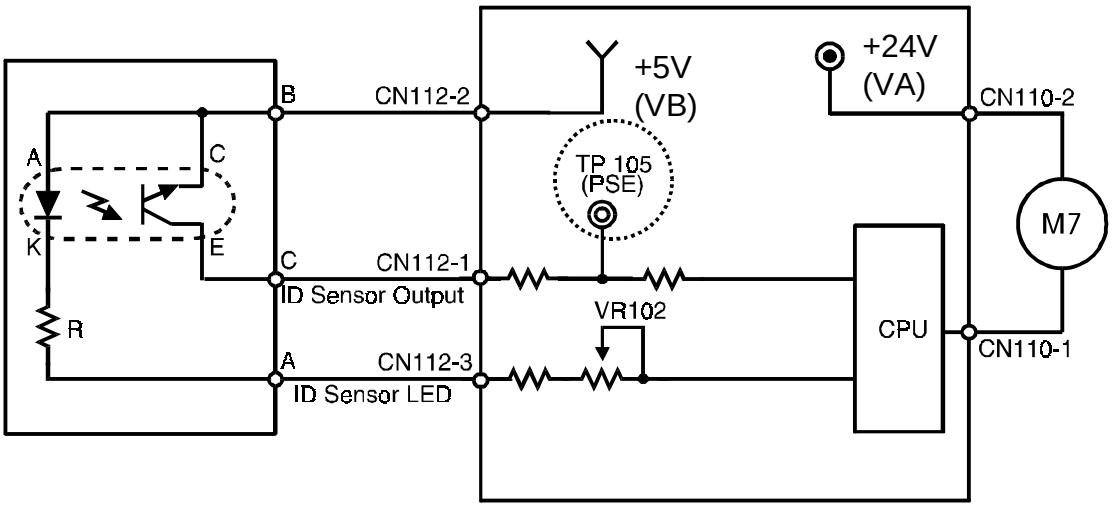
The main board supplies +24 volts to the CC/Grid/Bias power pack at CN1-1. When the ⟐ key is pressed, the CPU starts sending the bias trigger pulses to CN1-4. This energizes the development bias circuit within the CC/Grid/Bias power pack, which applies a high negative voltage to the development roller. The development bias is applied whenever the drum is rotating.

The bias trigger pulse applied to CN1-4 is a pulse width modulated signal (PWM signal). The width of the pulses controls the voltage level of the development roller. As the width of the trigger pulses increase, the voltage to the development roller also increases. The power pack is equipped with its own feedback circuit to monitor the development bias voltage.

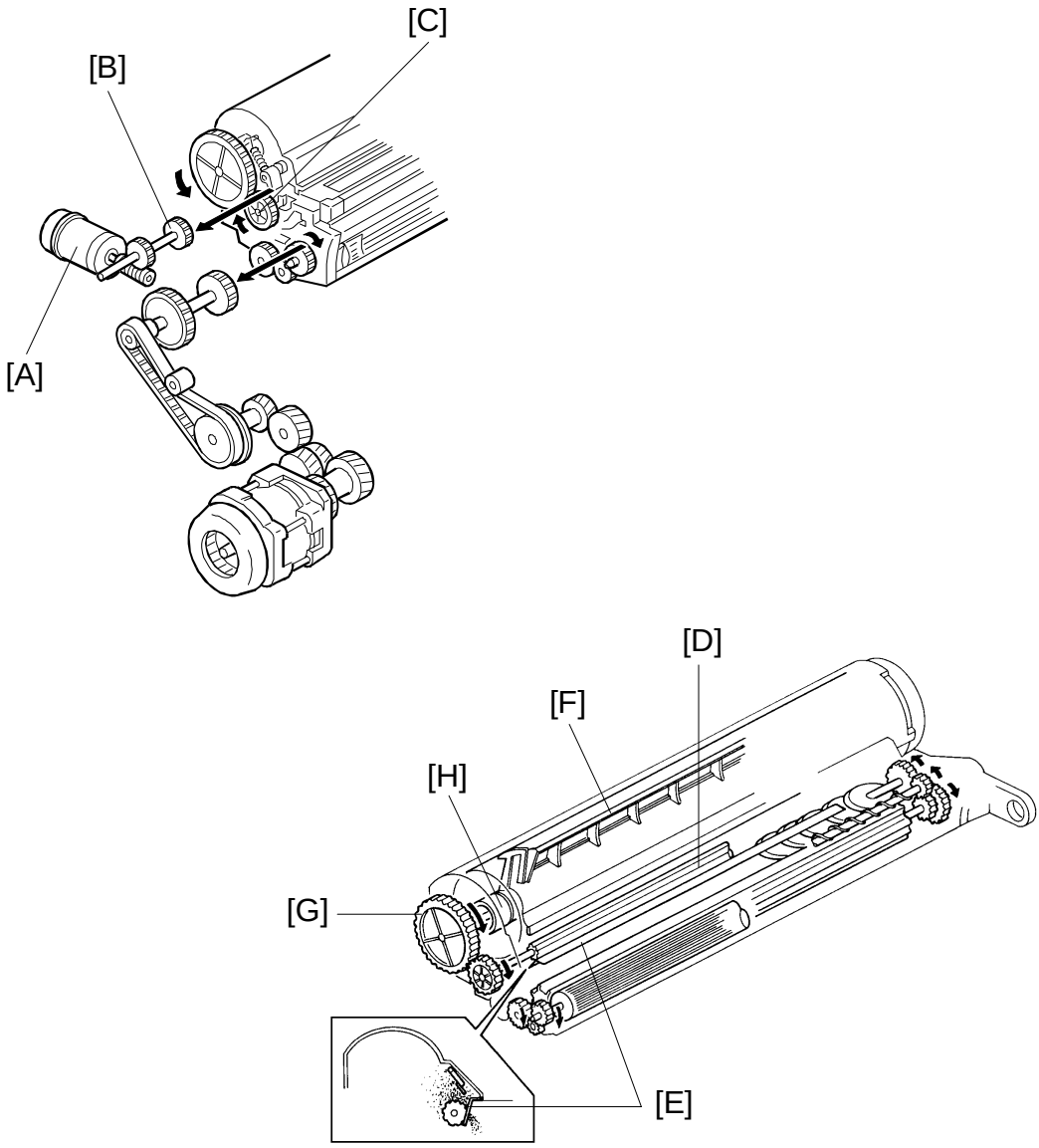
11. TONER DENSITY DETECTION AND TONER SUPPLY

11.1 ID Sensor Control Circuit

This circuit is different from the A151 and A152 copiers at the (dashed circle) indicated location.



11.2 TONER SUPPLY AND AGITATOR DRIVE MECHANISM



When the toner supply motor [A] energizes, the toner supply drive gear [B] starts turning and drives the toner supply roller gear [C]. Toner catches in the grooves on the toner supply roller [D]. Then, as the grooves turn past the pin hole plate [E], the toner drops into the development unit through the pin holes.

The toner agitator [F] mechanism, which is contained in the toner cartridge, prevents toner from clumping. The toner agitator gear [G] turns whenever the toner supply motor energizes. Rotation passes through the toner cartridge casing to the agitator junction [H].

12. PAPER FEED

12.1 PAPER LENGTH DETECTION (Paper Feed Station)

The paper length is measured by the registration sensor while paper is fed past the registration sensor. The determined paper size is stored in memory.

This is performed during the first copy of a copy job.

As shown by the following table, the CPU determines the size of the paper in the paper tray based on the paper length measured by the registration sensor.

Paper length (mm)	Paper size
364	B4
356	10" x 14"
330	8 1/2" x 13"
297	A4R
279	8 1/2" x 11"
267	8" x 10 1/2"
257	B5R
254	8" x 10"
216	5 1/2" x 8 1/2"
210	A5R

Since the CPU does not have the paper length in memory for the first copy cycle, the CPU controls the machine for the maximum paper size of B4 (257 mm x 364 mm).

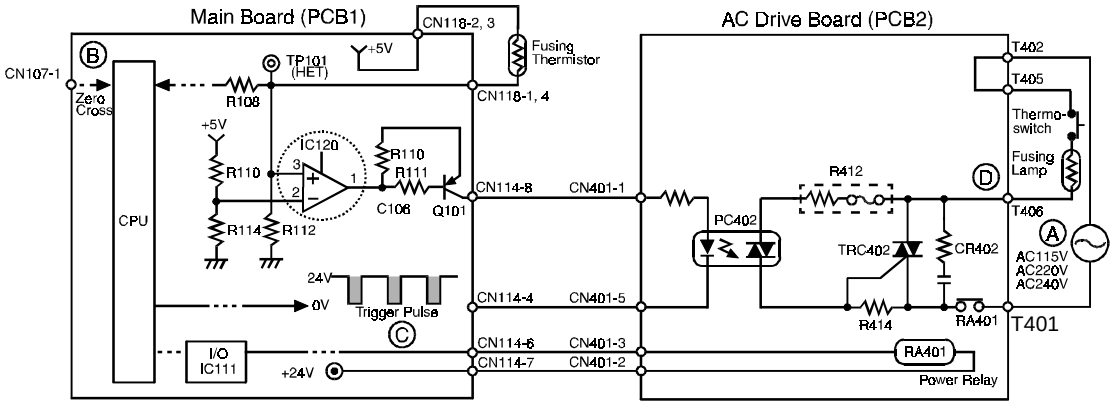
From the second copy cycle on, the CPU controls the machine for the correct paper size based on the data stored during the first paper cycle.

Whenever the by-pass feed table is used, the CPU determines the paper size to be B4 (257 mm x 364 mm).

13. IMAGE FUSING

13.1 FUSING LAMP CONTROL CIRCUIT

The circuit of the main board is different from the A151 and A152 copiers at the indicated (dashed circle) location.



13.2 OVERHEAT PROTECTION

IC120 and Q101 form an overheat protection circuit. When the fusing lamp is controlled within the normal range, pin 1 of IC120 stays LOW; therefore, Q101 stays on, allowing PC402 to operate. If the hot roller temperature reaches 240°C, the resistance of the thermistor becomes too low. At that time, pin 1 of IC120 becomes HIGH, turning off Q101 and stopping PC402. At the same time "E53" lights on the operation panel and the power relay (RA401) turns off.

Even if the thermistor overheat protection fails, a thermoswitch installed in series with the fusing lamp prevents the fusing unit from excessive overheating. If the thermoswitch temperature reaches 170°C, the thermoswitch opens, removing power from the fusing lamp.

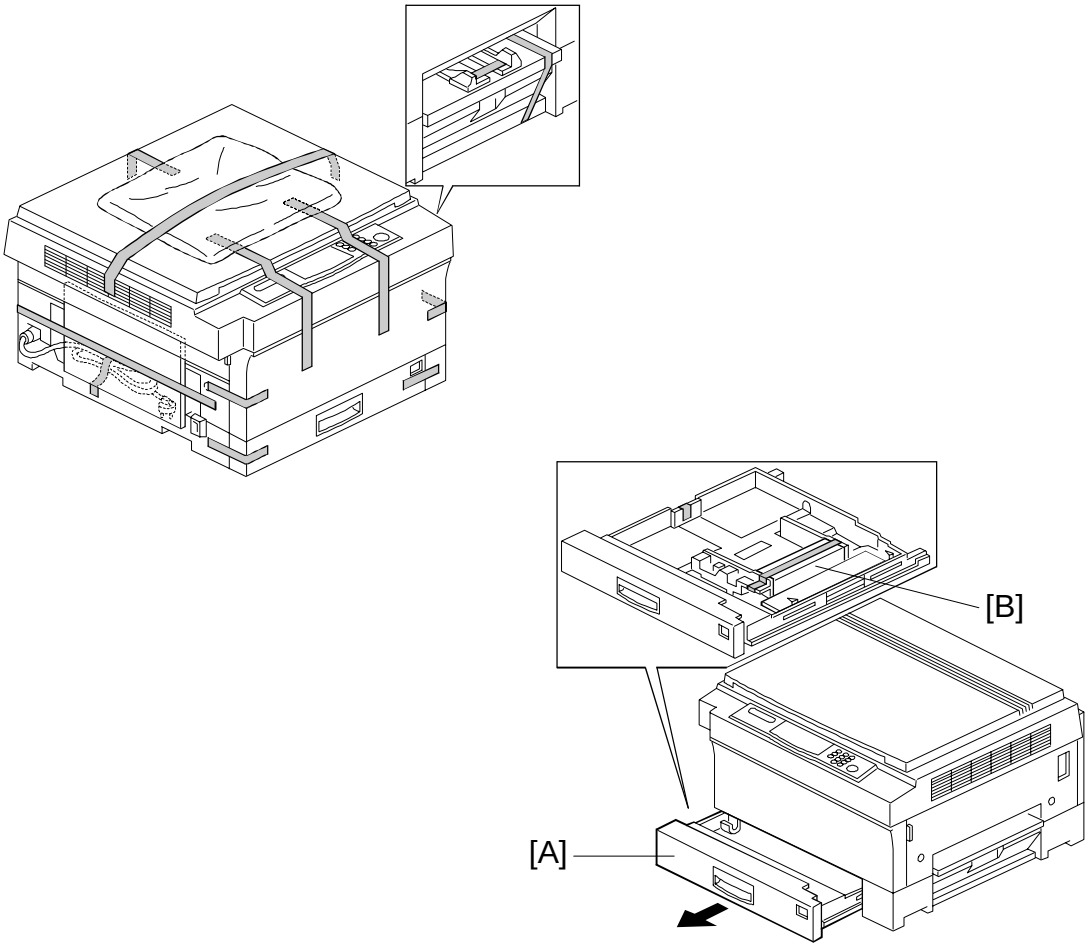
14. INSTALLATION

14.1 COPIER (A202/A203) ACCESSORY CHECK

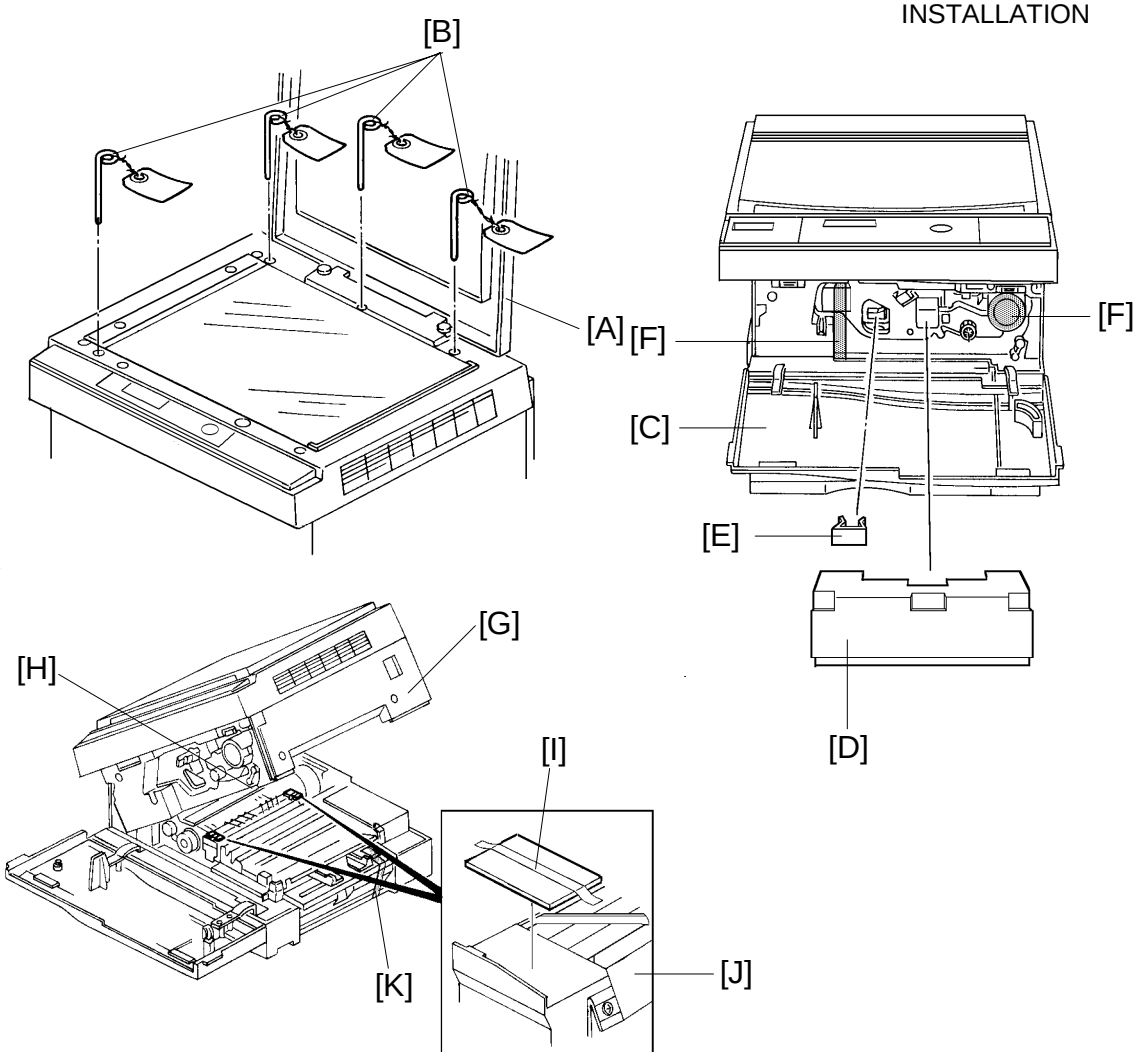
Check the quality and condition of the accessories in the box against the following list:

1. Model Name Decal (-10, -22 machines)
2. Symbol Explanation Decal - English
3. Symbol Explanation Decal - Multi-language (-26 machines)
4. Installation Procedure - Multi-language (-10, -15, -22, -26, -50 machines)
5. Operation Instructions - English (-10, -15, -17, -22, -26, -28, -29 machines)
6. Operation Instructions - Chinese (-19, -50 machines)
7. NECR - English (-17 machines)
8. NECR - Multi-language (-19, -27, -28, -29 machines)
9. Copy Tray
10. User Survey Card (-17 machines)

14.2 COPIER (A202/A203) INSTALLATION PROCEDURE



1. Remove the strips of tape from the copier as shown.
2. Pull out the paper tray [A], then remove the foam block [B] and tapes. Close the paper tray.



3. Open the platen cover [A] and remove the lock pins [B].
   (A202 copier: 2 pins, A203 copier: 4 pins)

   NOTE: Save the lock pins for future shipping use.

4. Open the front cover [C], and remove the foam block [D].

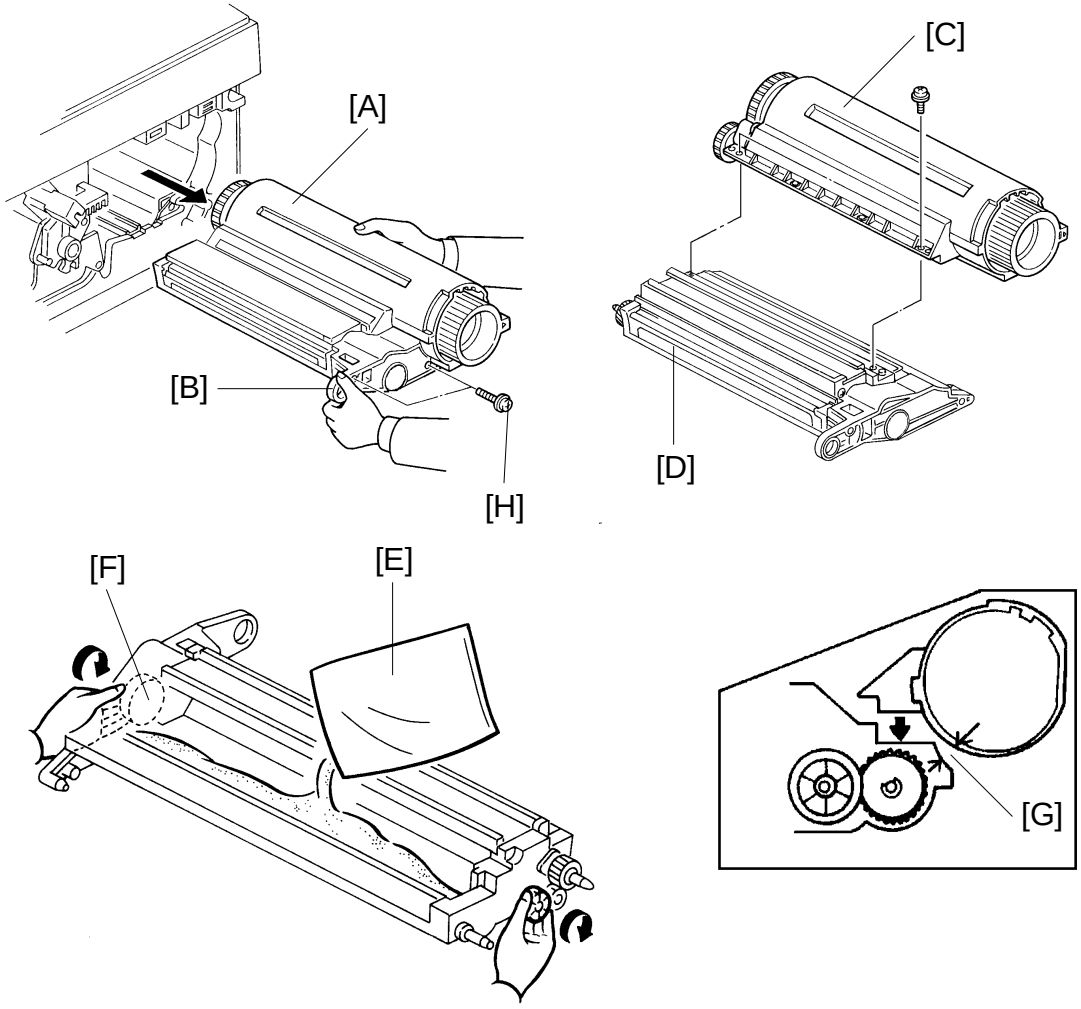
5. Remove the shipping retainer [E], tape and seal [F].

   NOTE: Save the shipping retainer for future shipping use.

6. Open the upper unit [G] by pressing the release lever [H]. Gently remove the shipping spacers [I] from the transfer/separation corona unit [J]. Remove the strip of tape [K] and close the upper unit.

⚠CAUTION

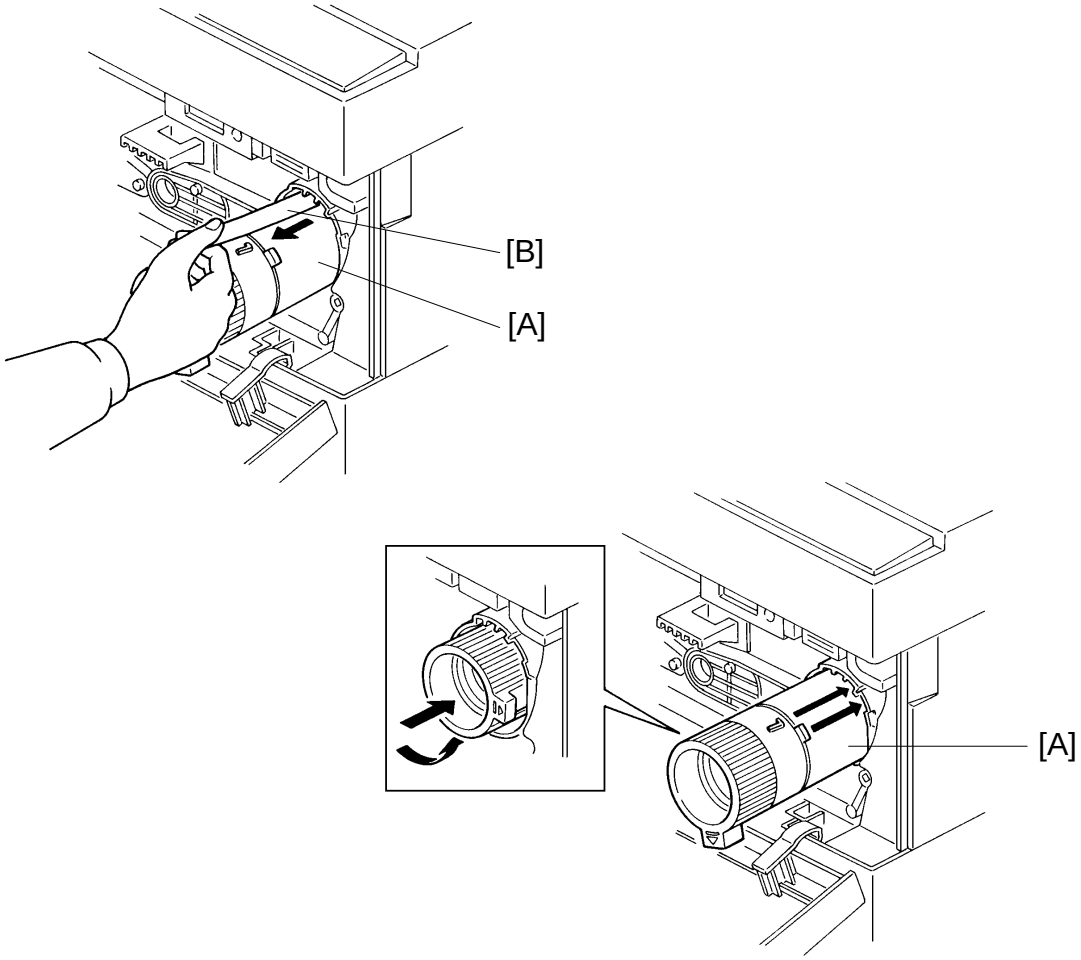
Be sure to place and hold your left hand on top of the upper unit while pushing the release lever to the right with your right hand. The upper unit will raise with force, and holding the upper unit will prevent it from lifting too rapidly.



7. Remove development unit retaining screws [H] (2 screws) and while pulling the left side of the development cover [B] carefully pull out the development unit. Place the development unit on a clean sheet of paper.
8. Remove the toner supply unit [C] from the development unit [D] (2 screws).

   NOTE: Do not remove the two center screws on the toner supply unit.
9. Shake one pack of developer [E] well, and pour it into the development unit, while rotating the gears [F] on both sides to distribute the developer evenly as shown in the illustration.
10. Reinstall the toner supply unit on the development unit.

    NOTE: Make sure that there is no gap [G] between the toner supply unit and the development unit. (See the illustration.)

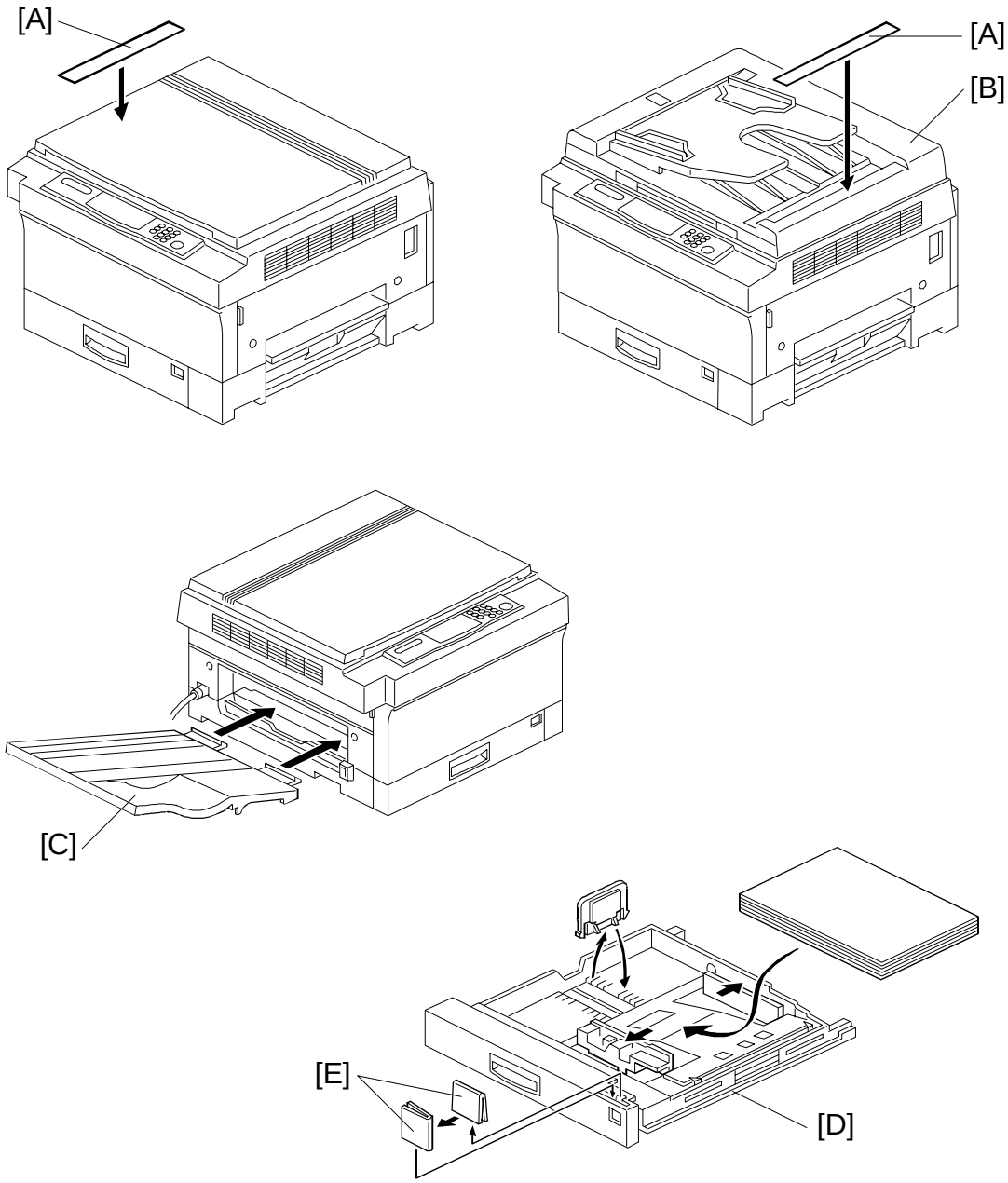


11. Reinstall the development unit.
12. Shake well a toner cartridge [A], check to be sure the toner agitator in the cartridge turns freely and slide it into the machine, while pulling off the seal [B]. Then, complete installing the cartridge as shown.
13. Close the front cover.

14. Do the developer initial setting procedure.
    1) Plug in the machine and turn on the main switch, then lower the platen cover.
    2) Enter the SP mode as follows:
        a) Enter "71" using the number keys.
        b) Press and hold the C/⊘ key until a dot (•) appears in the top left corner of the copy counter.
        c) Release the C/⊘ key and again press the C/⊘ key again.
        d) Press the ▯ key, then input 65 with the number keys.
    3) Operate SP 65 as follows.

SP Mode Number		Procedure
65	Developer Initial Setting	Enter "65" using the number keys and press the ▯ key. "50" will be displayed in the copy counter. Press the ◇ key to start the initial setting. It takes about 5 minutes.

(Continue to next page.)



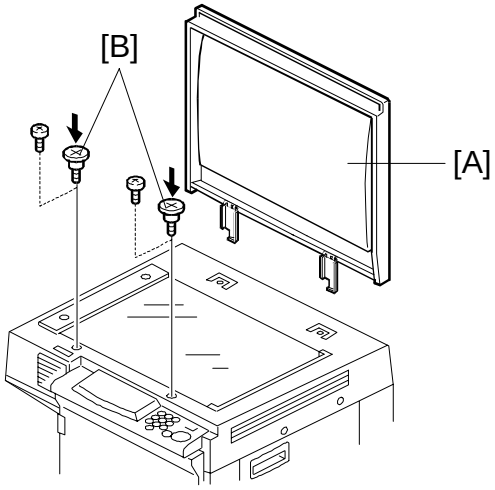
15. Place the decal [A] (symbol explanation) on the platen cover as shown, or when the DF [B] is installed on the machine, place the decal on the DF as shown.
16. Install the copy tray [C].
17. Load paper into the paper tray [D] as explained in the instructions written on the paper tray.
18. Change the paper size plate [E] to display the correct paper size.
19. Check the machine operation and copy quality.

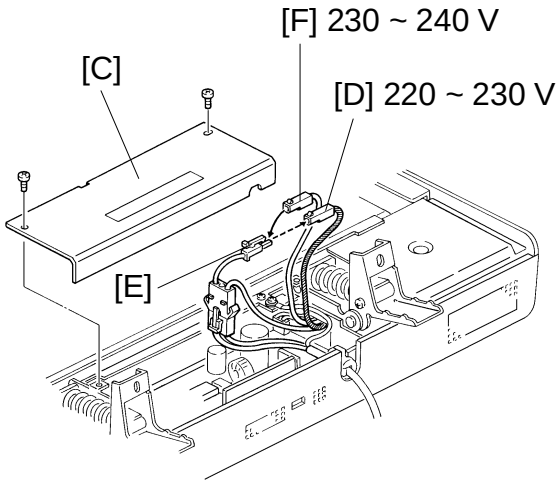
14.3 DOCUMENT FEEDER (A662) ACCESSORY CHECK

Check the accessories against the following list:

Description	Q'ty
1. Voltage Reference Decal	1
2. Thumb Screw M4 x 12	2
3. Stud Screw (M3)	2
4. Installation Procedure - English	1
5. NECR - Multi-language	1
6. Interface Unit for A219 copier	1
7. Accessory Kit for A203 copier	1
• Interface Unit Bracket	1
• Stud Screw (M4)	2
• Harness Clamp	1
• Upper Unit Stand	1
• Stepped Screw (Short)	1
• Stepped Screw (Long)	1
• Magnet	1
• Operation Decal	1
• Screw Driver	1

14.4 DOCUMENT FEEDER (A662) INSTALLATION PROCEDURE



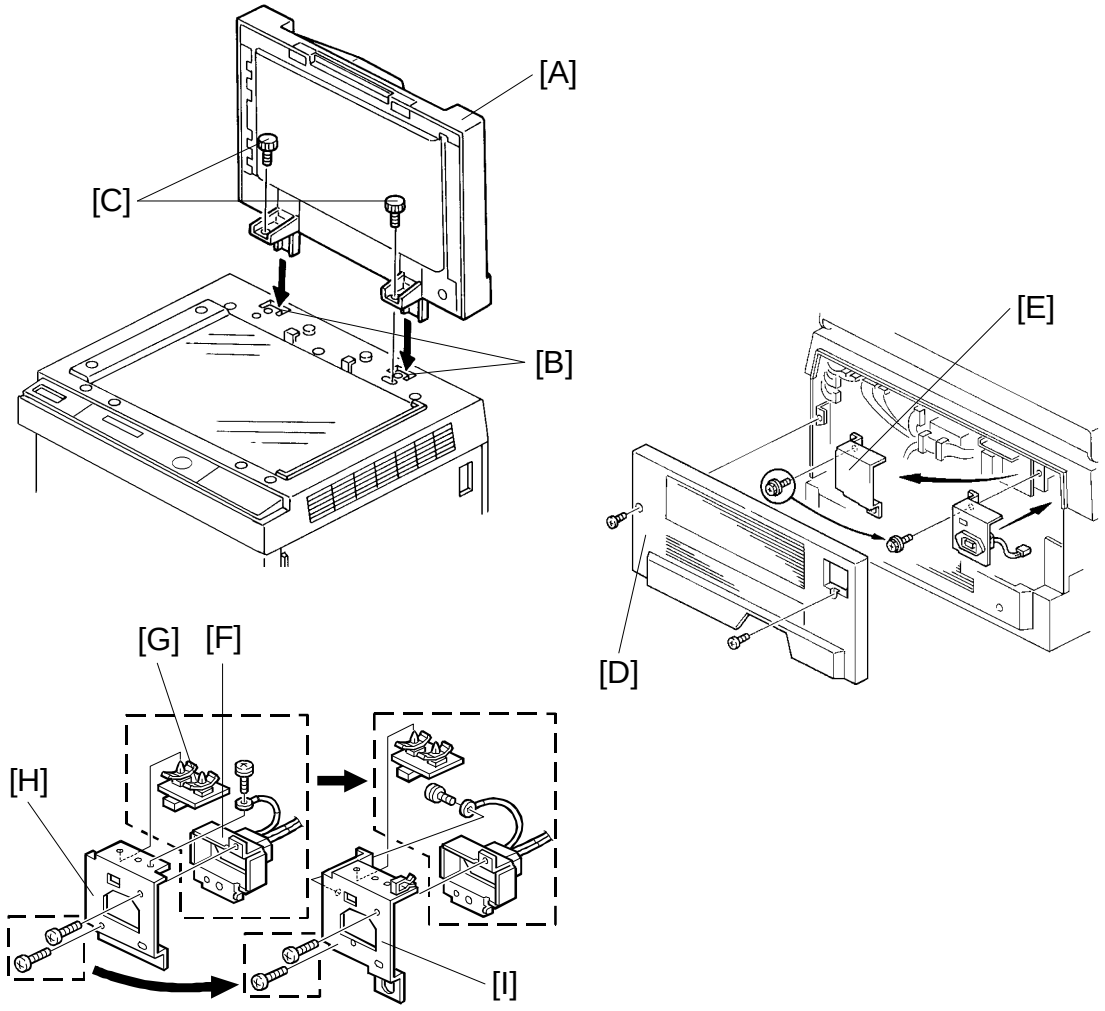


⚠CAUTION
When installing the DF, make sure that the copier is unplugged.

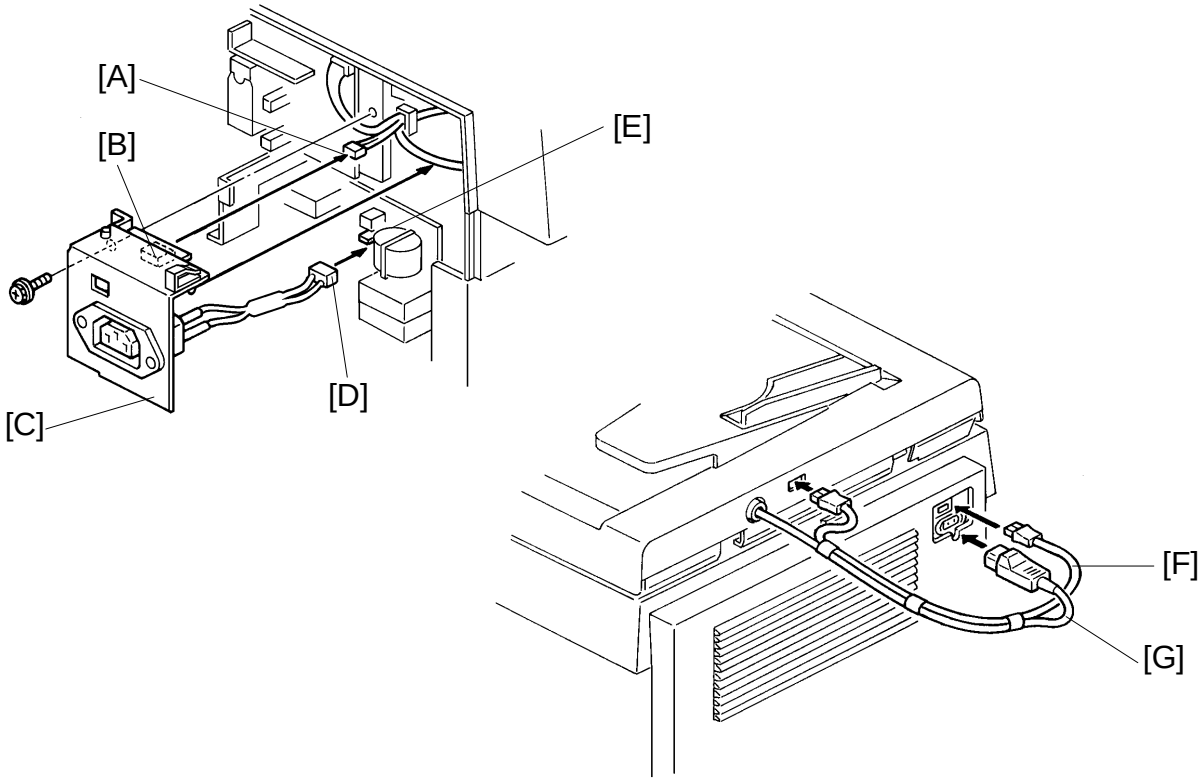
1. Remove the platen cover [A] from the copier.
2. Replace the 2 screws with the 2 stud screws [B].
   - Use the M4 stud screws.
3. Remove the strips of tape from the DF.

⚠CAUTION
The next step (step 4) must be done only for 240 volt areas.

4. Perform the conversion from 220 ~ 230 V to 240 V as follows:
   1) Remove the main board cover [C] (2 screws).
   2) Disconnect the connector for 220 ~ 230 V [D] (Black Wire) from the ac harness connector [E] and connect the connector for 240 V [F] (White Wire) to the ac harness connector.
   3) Reinstall the cover.



5. Insert the DF [A] into the slots [B] in the copier upper cover.
6. Secure the DF to the copier (2 thumb screws [C]).
7. Remove the upper rear cover [D] (2 screws).
8. Remove the ADF bracket [E] (1 screw and 1 clamp).
9. Remove the interface harness [F] (3 screws) and the interface board with 2 locking supports [G] from the A219 interface unit bracket [H].
10. Attach the interface board and the interface harness to the A203 interface unit bracket [I] (3 screws).



11. Locate the 4P connector [A] and connect it to the ADF interface board [B], then attach the ADF interface unit [C] to the copier (1 screw) while securing the harnesses through the wire clamp.

    NOTE: Use the screw that secured the ADF bracket. (See the previous page.)

12. Plug the connector [D] (3P/Black) into CN418 on the ac drive board [E] as shown.

13. Reinstall the upper rear cover.

14. Plug the optics fiber cable [F] into the DF and the copier as shown.

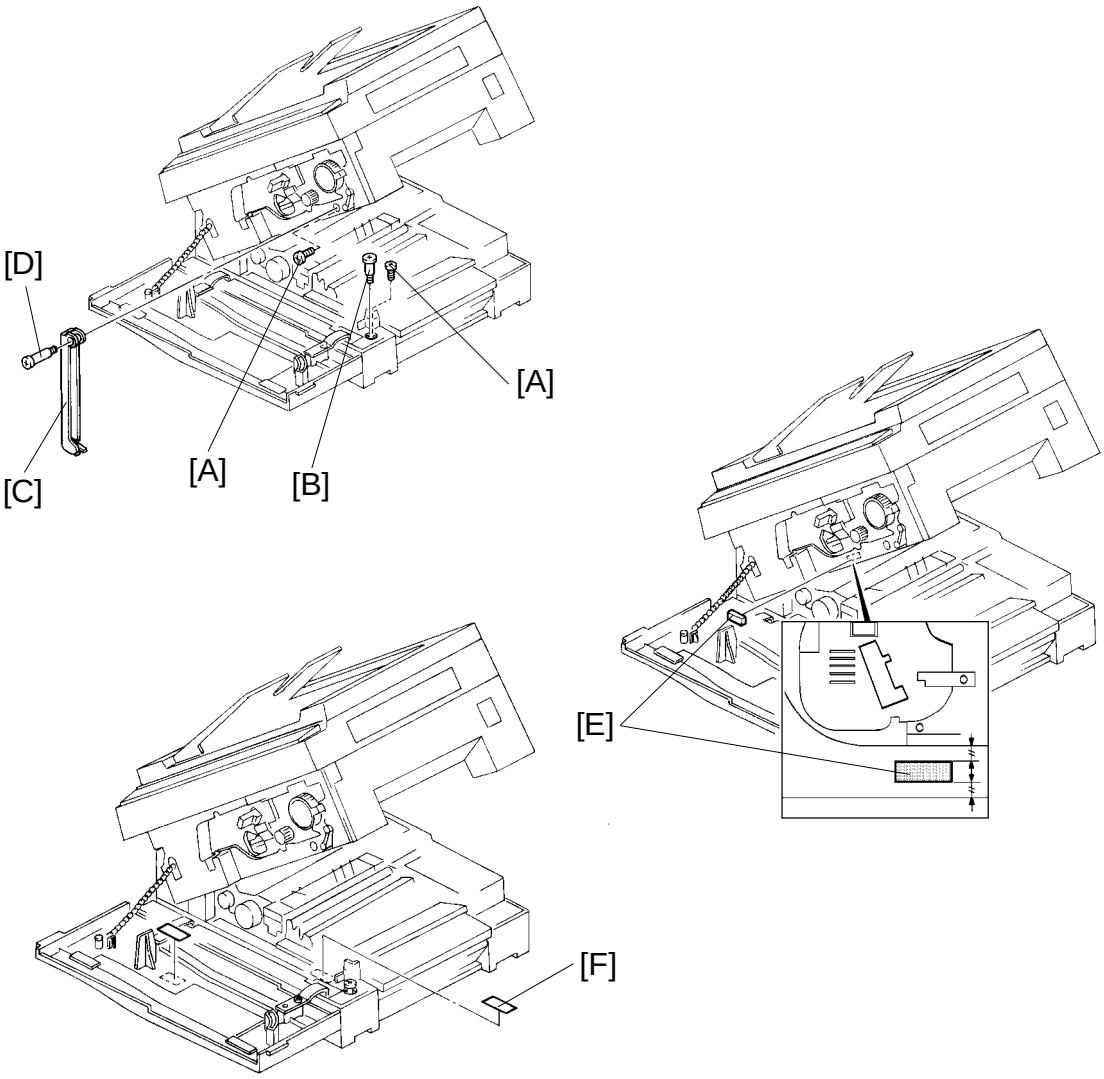
15. Plug the DF power supply cord [G] into the outlet in the rear of the copier as shown.

16. Open the front cover.

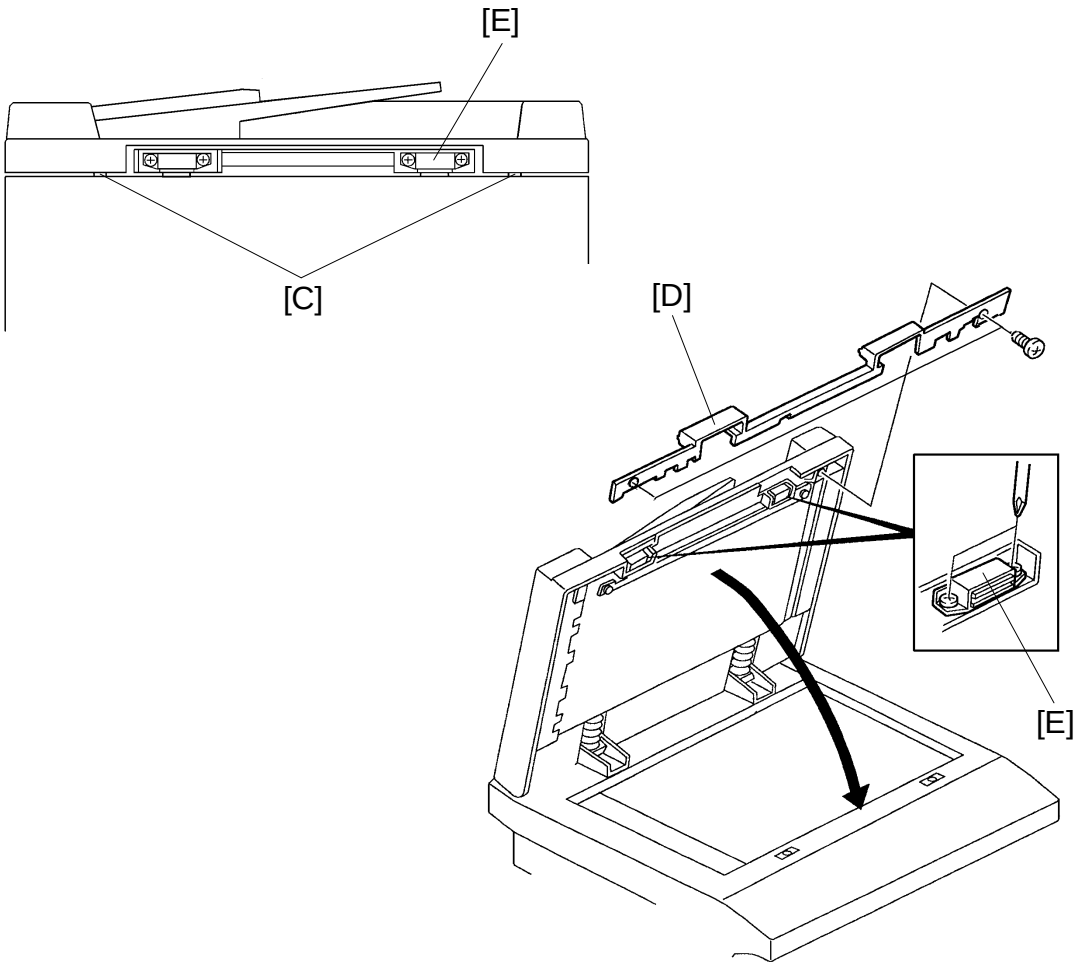
17. Lift up the upper unit.

⚠CAUTION

Be sure to place and hold your left hand on top of the upper unit while pushing the release lever to the right with your right hand. The upper unit will raise with force, and holding the upper unit will prevent it from lifting too rapidly.



18. Remove 2 screws [A].
19. Tighten the shorter stepped screw [B].
20. Install the upper unit stand [C] (1 longer stepped screw [D]).
21. Attach the magnet [E] as shown.
22. Attach the decal [F] as shown.
23. Close the upper unit and the front cover.
24. Instruct key operators how to use the upper unit stand.



25. Check that the rubber pad [C] is in contact with the top of the operation panel cover. If it is not, remove the DF grip [D] (2 screws), then adjust the position of the magnet catch [E] so that the rubber pad is in contact with the top of the operation panel cover.

26. Turn on the main switch and check the operation of the DF.

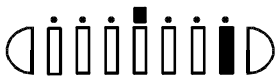
15. SERVICE PROGRAM MODE

15.1 ACCESS PROCEDURE 1-KEY OPERATION

1. Turn on the main switch.
2. Enter "71" by using the number keys.
3. Press and hold the C/⊘ key until a dot (•) appears in the top left corner of the Copy Counter and then release it.
4. Press the C/⊘ key again and then press the 0 key.

   NOTE: "5" will blink in the Copy Counter to show that the SP mode has been accessed.
5. Enter the desired SP mode number using the number keys. The SP mode numbers are given in the Service Program Mode Table.

   NOTE: "1" is displayed in the Manual ID indicator (as shown below) instead of "1" in the Copy Counter when SP mode numbers over "100" are entered. The maximum number is "111".

    : "1"
6. Press the # key to view the current setting.

   NOTE: To enter a different SP mode number, press the # key.
7. To leave SP mode, open and close the front cover or turn the main switch off and on.

15.2 MEMORY CLEAR PROCEDURE

– Clear Counters (SP98) –

NOTE: This SP mode clears the following counters:

- SP100: By-pass Feed Copies
- SP101: Paper Tray Copies
- SP103: Total Copies
- SP106: DF Originals
- SP110: Total Misfeeds
- SP111: Total Service Calls

1. Enter SP mode. (Refer to the SP mode access procedure on page 8-34.)
2. Enter "98" with the number keys, then press the key to view the current setting.
3. Enter "1" using the number keys, then press the and keys at the same time.

   NOTE: The Manual Image Density indicator blinks back and forth when the above procedure is completed.
4. Turn off the main switch.

15.3 CLEAR ALL MEMORY PROCEDURE

CAUTION: The Clear All Memory procedure (SP99) resets all the correction data for copy process control and all the software counters, and returns all modes and adjustments to the default settings. Normally, this SP mode should not be performed. This procedure is required only when replacing the EEPROM or when the copier malfunctions due to a damaged EEPROM.

1. Enter SP mode. (Refer to the SP mode access procedure on page 8-34.)
2. Enter "99" with the number keys, then press the ◐ key to view the current setting.
3. Enter "1" with the number keys, then press the ◐ and ◑ keys at the same time.

   NOTE: The Manual Image Density indicator blinks back and forth when the above procedure is completed. Be certain to complete the following.
4. Clean the used toner tank, since the toner end counter has been cleared. (See Used Toner Removal in the A151/A152 Service Manual.)

CAUTION: Skipping this step will cause the used toner overflow condition not to be detected properly.

5. Load new developer. (See Developer Replacement in the A151/A152 Service Manual.)

   NOTE: Since the software counter for the development bias voltage in the toner detection cycle has been cleared, –20 volts will be applied to the development roller for the initial 499 copies.
6. Clean the optics, sensors, and inside of the copier if necessary.
7. Refer to the "FACTORY SETTING" table located inside the upper slit of the inner cover and enter the data for:
   1) SP60: Standard Image Grid Voltage Setting
   2) SP62: Standard ID Sensor Grid Voltage Setting

9. Perform the following SP modes in sequence:
    1) SP66: Drum Initial Setting
    2) SP65: Developer Initial Setting
    3) SP48: Light Intensity Adjustment
    4) SP56: ADS Voltage Adjustment
    5) SP54: Vsg Adjustment
    6) SP42: Registration Adjustment
    7) SP41: Leading Edge Erase Margin Adjustment
    8) SP43: Vertical Magnification Adjustment
    9) SP44: Horizontal Magnification Adjustment (A203 copier only)
    10) SP47: Focus Adjustment (A203 copier only)
10. Turn off the main switch.

15.4 SERVICE PROGRAM MODE TABLE

1. Items marked with an ✻ are different from the A151 and A152 copiers.
2. A "†" after the mode name signifies that copies can be made while in the SP mode. (Copies can be made by pressing the [Start] key after pressing the [Reset] key.)
3. In the *Function* column, comments (extra information) are in italics.
4. In the *Settings* column, the default value is printed in bold letters.
5. For some SP modes, display of the settings is different between the A202 and A203 models because of the difference in the operation panel. After entering the desired SP mode number, refer to the notes written at the end of the table to correctly observe the displayed setting. (Which note to refer is described inside the Function column.)

Mode No.		Function	Settings
5	Free Run with Exposure Lamp OFF †	Turn on DPS101-1, then press the [Start] key to start the free run. Press the [Clear/Stop] key to stop the free run. Press the [Reset] key in Ready mode to turn off this mode.	
		Use this mode for the scanner movement check. To save toner, remove the development unit. **Refer to NOTE 1**	
6	Misfeed Detection Off †	Copies are made without misfeed detection. Press the [Start] key to make a copy. Press the [Reset] key in Ready mode to turn off this mode.	
		Use this mode to check whether a paper misfeed was caused by a sensor malfunction. The total counter increments when copies are made in this mode. **Refer to NOTE 1**	
7	Aging Mode	Factory use.	
8	Input Check †	Displays the inputs from sensors and switches. **Refer to NOTE 1**	For details, see page 46.
9	Output Check	Turns on electrical components.	For details, see page 47.
11	All Indicators ON	Turns on all the indicators on the operation panel.	
		To turn off the indicators, press the [Reset] key.	
14	Auto Reset Time Setting (Energy Star)	Select the auto shut off time. The copier main switch is shut off automatically after the selected auto shut off time, if SP77 is at "0".	**0: 30 min.** 1: 15 min. 2: 60 min. 3: 90 min. 4: 120 min.

Mode No.		Function	Settings
15	Auto Shut Off Time (Energy Saver Mode)	Selects an auto reset time of 1 or 3 minutes, or cancels this mode. *The copier automatically goes to the energy saver mode at the selected reset time if SP78 is at "1".*	**0: 1 min.** 1: 3 min. 2: None
16	Count Up/Down	Selects count up or count down.	**0: Up** 1: Down
17	Open	No function.	
18	[ ] Key Function (A203 copier only)	Specifies whether reduction or enlargement is selected first when the [ ] key is pressed.	**0: Reduction** 1: Enlargement
19	ADS Priority	Specifies whether the copier defaults to ADS or manual mode when the main switch is turned on.	**0: ADS** 1: Manual
* 22	SADF Shut off Time (A203 copier only)	Selects the shut off time for SADF mode. The DF must be installed on the machine.	**0: 5 s** 1: 60 s
29	Fusing Temperature Control	Selects the fusing temperature control mode. *After selecting the control mode and turning the main switch off/on, the fusing temperature control mode is changed.*	**0: ON/OFF control** 1: Phase control
30	Toner Supply Mode	Selects the toner supply system. *See SP31/SP32 for the toner supply amount.*	**0: Detect Mode** 1: Fixed Mode
31	Toner Supply Ratio (Detect Mode)	Determines how much toner is supplied in detect mode.	**0: 15%** 1: 7% 2: 30% 3: 60%
32	Toner Supply Ratio (Fixed Mode)	Determines how much toner is supplied in fixed mode.	**0: 7.0%** 1: 3.5% 2: 10.5% 3: 14.0%
33	ID Sensor Bias	Sets the bias voltage applied to the development roller for the ID Sensor Pattern. *0: Vo* *1: Vo+40 V* *2: Vo–20 V* *3: Vo–40 V*	Toner Density **0: Normal (Vo)** 1: Low 2: High 3: Higher
34	ADS Level	Selects the image density level in ADS mode. *setting: 1* *Increases grid voltage (–40 V). Development bias voltage is not changed.* *setting: 2* *Increases development bias voltage (–40 V). Grid voltage is not changed.*	**0: Normal** 1: Darker 2: Lighter
35	ID Detection Interval	ID sensor check is performed every 5 copies or 10 copies. *If low image density occurs in the near end condition, change the setting to "1".*	**0: 10 copies** 1: 5 copies

Mode No.		Function	Settings
37	Image Bias Adjustment †	Adjusts image bias output if the image density at level 4 cannot be adjusted by the Light Intensity adjustment (SP48). **Refer to NOTE 1** *0: Vo* *1: Vo+40 V* *2: Vo+20 V* *3: Vo–20 V* *4: Vo–40 V*	0: Normal (Vo) 1: Darkest 2: Darker 3: Lighter 4: Lightest
41	Lead Edge Erase Margin Adjustment †	Adjusts the lead edge erase margin. *0.4 mm per step. (–3.2 mm to +2.8 mm)* **Refer to NOTE 1**	0 ~ 15 **Default = 8**
42	Registration Adjustment †	Adjusts registration. *0.4 mm per step. (+3.2 mm to –2.8 mm)* **Refer to NOTE 1**	0 ~ 15 **Default = 8**
43	Vertical Magnification Adjustment †	Adjusts magnification in the paper travel direction. *0.2% per step. (–1.6% to +1.4%)* **Refer to NOTE 1**	0 ~ 15 **Default = 8**
44	Horizontal Magnification Adjustment (A203 copier only) †	Adjusts magnification perpendicular to the direction of paper travel. *0.2% per step. (–1.6% to +8.4%)* **Refer to NOTE 1**	0 ~ 50 **Default = 8**
45	Registration Buckle – Paper Feed †	Adjust the amount of paper buckle in the registration area. *0.4 mm per step. (–3.2 mm to +2.8 mm)* **Refer to NOTE 1**	0 ~ 15 **Default = 8**
47	Focus Adjustment (A203 copier only) †	Adjusts the 4th/5th mirror position to correct focus. *This mode must be done after horizontal and vertical magnification adjustment (SP43 and 44).* **Refer to NOTE 1**	0 ~ 100 **Default = 40**
48	Light Intensity Adjustment †	Adjusts the exposure lamp voltage. *Before performing this mode, clean the optics and perform SP95. After performing this mode, perform SP56. The exposure lamp voltage is adjusted on the production line.* ***Refer to NOTE 1 (and NOTE 2 for the A202 copier).***	100 ~ 170 **Default = 126**
49	Fusing Temperature Adjustment	Adjusts the control temperature of the hot roller during copying in 1°C steps.	175°C ~ 200°C **Default = 185°C**
50	Image Bias Adjustment at ID Level 7 †	Adjusts image bias voltage at ID level 7. *0: Vo* *1: Vo+40 V* *2: Vo–40 V* *3: Vo–80 V* ***Refer to NOTE 1.***	**0: Normal (Vo)** 1: Darker 2: Lighter 3: Lightest

Mode No.		Function	Settings
51	Exposure Lamp Setting Display	Displays the exposure lamp setting with a reference number.	100 ~ 150
		The exposure lamp and optics cooling fans turn on for 10 seconds when the [◐] key is pressed. Press the [C/⊘] key to turn this mode off. Do not repeat more than 5 times, to avoid overheating the optics cavity. ***Refer to NOTE 2 for the A202 copier.***	
52	Fusing Temperature Display	Displays the fusing temperature.	
		Refer to NOTE 2 for the A202 copier.	
54	Vsg Display/ Adjustment	Displays Vsg.	
		Adjust Vsg to 4.0 ± 0.2 V using VR102 on the main board. The main motor and the ID sensor LED turn on when the [◐] key is pressed. ***Refer to NOTE 3 for the A202 copier.***	
55	Vsg & Vsp Display †	Displays the Vsg and Vsp readings. The Vsg reading is displayed while the "0" key is held down. The A202 copier displays the Vsp reading while the "1" key is held down. In the A203 copier, Vsp is always displayed in the magnification indicator. To stop this mode, press the [C/⊘] key.	
		The Vsp and Vsg voltage readings are updated every 10 or 5 copies depending on the SP35 selection. In free run mode, the Vsg and Vsp readings are updated every copy cycle. ***Refer to NOTE 1 (and refer to NOTE 3 for the A202 copier).***	
56	ADS Reference Voltage Display and Adjustment	Displays the ADS reference voltage.	
		Before performing this mode, clean the optics, and perform SP95 and SP48. After adjusting the light intensity (SP48), place 5 sheets of A3 (LDG) white paper on the exposure glass and select this mode. Adjust the ADS voltage to 2.5 ± 0.1 V using VR101 on the main board. ***Refer to NOTE 3 for the A202 copier.***	
57	Drum Rotation Time	Displays the total time that the drum has rotated.	
		"Minutes" is displayed first. Press and hold the [0] key to display "Hours".	
58	Toner End Counter	Displays the toner end condition counter.	
		The toner end counter counts up 1 after 200 copies are made following toner cartridge replacement.	
✻ 59	Optics Temperature Display	Displays the optics temperature detected by the optics thermistor. Press the [◇] key to monitor the temperature during the normal copy cycle.	

Mode No.		Function	Settings
60	Standard Image Grid Voltage Setting	Factory use only. **Do not change the setting.** ***Refer to NOTE 5.***	0 ~ 8 **Default = 4**
62	Standard ID Sensor Grid Voltage Setting	Factory use only. **Do not change the setting.** ***Refer to NOTE 5.***	0 ~ 8 **Default = 4**
63	Toner Density Level Setting	Factory use only. **Do not change the setting.**	
64	Toner Density Level Display	Displays the toner density level detected during initial setting (SP65). *Setting Vsp/Vsg(%)* *0: 12–15* *1: 0–7* *2: 8–11* *3: 16–21* *4: 22–100*	0 ~ 4
65	Developer Initial Setting	Agitates new developer for about 5 minutes. "50" is displayed in the copy counter when the [◐] key is held down. Press the [◇] key to start the initial setting. ***Initial setting must be done when new developer is installed.*** *The copier automatically returns to normal mode after initial setting is completed.*	
66	Drum Initial Setting	Used to condition the new drum. ***Initial setting must be done when a new drum is installed.*** *The Drum Rotation Time (SP57) and the OPC counter (SP69) are cleared.*	**0: No** 1: Yes
69	OPC Counter	Shows the total number of copies made with the drum installed in the machine. ***Refer to NOTE 4.***	
✻ 71	V_L Correction Selection	Selects or deselects V_L correction. Keep this setting at 0.	**0: V_L correction** 1: No V_L correction
✻ 77	Auto Shut Off (Energy Star) On/Off	Selects the "Automatic Shut off" mode. *The copier automatically shuts itself off at the auto shut off time selected (SP14).*	0: Yes (Default for N. America) 1: No (Default for other areas)
78	Auto Energy Saver Mode	Selects the "Automatic Energy Saver" mode. *The copier automatically goes to Energy Saver mode at the auto reset time selected (SP15).*	**0: No** 1: Yes

Mode No.		Function	Settings
✻ 80	Horizontal Edge Margin Width Adjustment	Selects whether the side erase mechanism changes when the optional document feeder is installed. *Compared with the platen mode erase, the next inmost LED block will turn on to erase.*	**0: Always stays in Platen Mode** 1: DF Mode
✻ 81	Factory Initialization	Factory use only. **Do not change the setting.**	
83	Toner End Counter Clear	Clears the toner end counter (SP58). Resets the used toner overflow condition (E70) if it is detected. ***This mode must be performed when the used toner tank is cleaned.***	**0: No** 1: Yes
86	Energy Saving Ratio	Selects the energy saving ratio. *The greater the saving ratio, the longer the waiting time until the copier returns to the ready condition.* *Saving Ratio — Waiting Time* *0: 56% — 25 s* *1: 47% — 19 s* *2: 37% — 12 s* *3: 25% — 5 s*	**0: 56%** 1: 47% 2: 37% 3: 25%
95	V_L Correction Reset	Resets the exposure lamp setting and counter for the V_L correction. *Before performing this mode, clean the optics parts. After performing this mode, perform SP48 and SP56.*	**0: No** 1: Yes
✻ 96	Toner End Force Cancel	The Toner End condition is canceled forcibly. By pressing the ◑ key to enter this SP mode, the toner end condition is canceled.	
✻ 97	Service Call (E5) Reset	Resets a service call (E5) condition. Turn the main switch off and on to check if the service call condition is reset.	**0: Default** 1: Reset
98	Clear Counters	Clear the following counters: ✻Copy counters ✻SC counters ✻Misfeed counters To clear, enter "1" then press the ◑ key and the ◑ key at the same time. To avoid resetting the counter by mistake, the counter is reset only when the ◑ key and the ◑ key are pressed at the same time.	**0: No** 1: Yes
99	Clear All Memory	Clear all counters and returns all modes to the default settings. See the Clear All Memory Procedure in this section for more details. To clear, enter "1" then press the ◑ key and the ◑ key at the same time. To avoid resetting the counter by mistake, the counter is reset only when the ◑ key and the ◑ key are pressed at the same time.	**0: No** 1: Yes

Mode No.		Function	Settings
100	By-pass Feed Copies	Displays the total number of copies fed from the by-pass feed table.	
		Refer to NOTE 4.	
101	Paper Tray Copies	Displays the total number of copies fed from the paper tray.	
		Refer to NOTE 4.	
102	Open	No function.	
103	Total Copies	Displays the total number of copies.	
		Refer to NOTE 4.	
106	DF Originals (A203 copier only)	Displays the total number of originals fed from the DF.	
		Refer to NOTE 4.	
110	Misfeeds (total)	Displays the total number of paper misfeeds.	
		Refer to NOTE 4.	
111	Total Service Calls	Displays the total number of times the service call indicator has turned on.	

NOTE 1: 1) After the following SP mode numbers are entered, the copier goes automatically into copy mode when the Auto Image key is pressed:
SP mode numbers: 5, 6, 7, 52, 56, 59, and 65

2) After the following SP mode numbers are entered and the key is pressed, select the desired input numbers or SP mode settings and press the key.
SP mode numbers: 8, 37, 41, 42, 43, 44, 45, 47, 48, and 50

NOTE 2: The A202 copier displays the SP mode setting in the Copy Counter. Since the Copy Counter has only 2 digits, the first digit is displayed in the Manual Image Density indicator when the setting exceeds "99".

: "1"

NOTE 3: Make copies or perform free run to display the SP mode setting. The A202 copier displays the SP mode setting in the Copy Counter. Since the Copy Counter has only 2 digits, the first digit is displayed in the Manual Image Density indicator as shown below (digits after the decimal place are displayed in the Copy Counter):

: "0"

: "1"

: "2"

: "3"

: "4"

: "5"

For example:

= **"3.83"**

Copy Counter

NOTE 4: – A202 copier –
The A202 copier displays the SP mode setting in the Copy Counter. The first two digits are displayed first. Press the [0] key once to display the next two digits and press the [0] key one more time to display the last two digits (six digits in total).

– A203 copier –
The first three digits are displayed in the Magnification Indicator. Press and hold the [0] key to display the last three digits (six digits in total).

NOTE 5: The setting will vary depending on the factory setting. Refer to the "FACTORY SETTING" table located in the upper inner cover.

15.5 SP MODE 8-INPUT CHECK

– How to check sensor/switch inputs for the A202 copier –

1. Enter SP mode 8 as outlined in the Service Program Mode Access Procedure on page 8-34, then press the ◑ key.
2. The Manual Image Density indicator is used to display the inputs from the following components.
   If you wish to observe the input checks during a copy cycle, press the ◇ key to perform this mode while making a normal copy.

Sensor	Manual ID Level Indication	Display: Condition
Registration	ID Level 1	ON: Paper Present
Exit	ID Level 2	ON: Paper Present
Paper Tray Switch	ID Level 3	ON: Paper Tray Closed
Relay Sensor	ID Level 4	ON: Home Position
Scanner HP Sensor	ID Level 5	ON: Actuator inside sensor
Key Counter Set Signal	ID Level 6	ON: Key Counter Set (Ready for Copying)

– How to check sensor/switch inputs for the A203 copier –

1. Enter SP mode 8 as outlined in the Service Program Mode Access Procedure on page 8-34, then press the Auto Image ◑ key.
2. Enter the desired number from the following table.
3. Press the ◑ key again.
4. Enter the number of copies and press the ◇ key.
   Either "0" or "1" is displayed in the Magnification Indicator.

No.	Sensor/Switch/Signal	Display: Condition	
		"0"	"1"
1	Registration Sensor	Paper not detected (HIGH)	Paper detected (LOW)
2	Exit Sensor		
3	Paper Tray Switch	Paper tray opened (HIGH)	Paper tray closed (LOW)
4	Relay Sensor	Paper not detected (HIGH)	Paper detected (LOW)
12	Scanner HP Sensor	Sensor not actuated (LOW)	Sensor actuated (HIGH)
13	4th/5th Mirror HP Sensor (A203 copier only)		
14	Lens HP Sensor (A203 copier only)		
20	ADF Installation	ADF not installed	ADF installed
21	ADF Lift Switch	ADF closed	ADF opened
22	Key Counter Set Signal	Key Counter not set	Key Counter set

15.6 SP MODE 9–OUTPUT CHECK

– How to turn electrical components on/off –

1. Enter SP mode 9 as outlined in the Service Program Mode Access Procedure on page 8-34, then press the # key.
2. Enter the desired number from the following table.
3. Press the ◇ key to turn on the electrical component.
4. Press the C/◇ key to turn off the electrical component.

Number	Electrical Component
1	Main Motor + Quenching Lamp
2	Charge Corona + Standard Image Grid
3	Charge Corona + Standard ID Sensor Grid
5	Transfer Corona
6	Separation Corona
8	Erase Lamp
10	ID Sensor LED
11	Toner Supply Motor
12	Registration Clutch
13	Paper Feed Clutch
15	Relay Roller Clutch
17	Machine Shut Off
18	Exhaust Blower Motor
19	Optics Cooling Fan
20	Exposure Lamp + Optics Cooling Fan
21	Total Counter
30 ~ 37	Development Bias Voltage in 40-volt steps starting at –120 volts
38	Development Bias Voltage = –500 volts
40 ~ 48	Grid Voltage in 60-volt steps starting at –400 volts

16. SERVICE TABLES

16.1 TEST POINTS

Copier Main Board

Number	Function
TP101	HET (Fusing Thermistor)
TP102	ADS (Auto Image Density Sensor) Adjust the voltage to +2.5 ± 0.1 volts with VR101.
TP103	ETH (Optics Thermistor)
TP105	PSE (ID Sensor Voltage) Adjust the voltage to +4.0 ± 0.2 volts with VR102.
TP106	EXPO (Exposure Lamp Voltage)
JP101	Key Counter (Cut this jumper wire when installing the key counter on the machine.)

16.2 DIP SWITCHES AND JUMPER SWITCHES

The following jumper switches are not included.

* JPS101-R (Upper)
* JPS101-C (Lower)

16.3 VARIABLE RESISTORS

CC/Grid/Bias Power Pack

Number	Function
VRC	Adjusts the charge corona current
VRG	Adjusts the standard grid voltage
VRB	Adjusts the standard development bias voltage

16.4 SERVICE CALL AND USER CODE TABLE

NOTE: Items marked with an ✻ are different from the A151 and A152 copiers.

Service Call Code

NOTE: Due to the small capacity of the system EEPROM, the individual service call counters that were available in previous models of these base copiers have been eliminated.

E-code	Contents	Note
11	**Exposure Lamp Error** The feed back signal becomes higher than 4.2 volts (rms) for 1.0 second when the exposure lamp is on, or it becomes higher than 1.0 volt (rms) for 1.0 second when the exposure lamp is off.	
12	**Exposure Lamp Error** The feed back signal falls below 0.5 volt (rms) for 1.0 second when the exposure lamp is on, or the exposure lamp stays on for longer than 10 seconds.	
13	**Zero Cross Signal Error** The CPU does not receive the zero cross signal within 2.0 seconds.	
✻ 14	**Frequency Detection Error** • The detected frequency is not within 45 ~ 65 Hz. • The fusing lamp stays on for longer than 38 seconds while the main motor is off.	
21	**Scanner Home Position Error** The scanner home position sensor's output remains LOW (de-actuated) for 9 seconds after the main switch is turned on.	
22	**Scanner Home Position Error** The scanner home position sensor's output remains HIGH (actuated) for 1.0 second after the scanner starts.	
28	**Lens Home Position Error** (A203 copier only) The lens home position sensor's output remains LOW (de-actuated) for 6.0 seconds after the lens moves to the home position.	
29	**Lens Home Position Error** (A203 copier only) The lens home position sensor's output remains HIGH (actuated) for 4.0 seconds after the lens leaves the home position.	
2A	**4th/5th Mirror Home Position Error** (A203 copier only) The 4th/5th mirror home position sensor's output remains LOW (de-actuated) for 3.0 seconds after the 4th/5th mirror assembly moves to the home position.	

E-code	Contents	Note
2B	**4th/5th Mirror Home Position Error** (A203 copier only) The 4th/5th mirror home position sensor's output remains HIGH (actuated) for 4.0 seconds after the 4th/5th mirror assembly leaves the home position.	
40	**Optics Thermistor Error** The optics thermistor is defective (open).	
✻ 52	**Fusing Warm-up Error** The temperature detected by the thermistor does not reach 150°C within 25 seconds after the main switch is turned on.	SP97 must be performed to clear this service call condition.
✻ 53	**Fusing Overheat** The temperature detected by the thermistor becomes higher than 230°C.	
✻ 54	**Fusing Error** The temperature detected by the thermistor does not rise more than 20°C within 12 seconds when the fusing lamp is turned on continuously in the main motor off condition.	
✻ 55	**Fusing Thermistor Open** The temperature detected by the thermistor does not reach 40°C within 15 seconds after the main switch is turned on.	
✻ 70	**Used Toner Overflow** The overflow counter reached 80 k copies or the toner cartridge was replaced 10 times.	
✻ 96	**DF Timing Pulse Error** The DF CPU does not receive a DF timing pulse within 100 milliseconds. **Main Switch Error** The main switch does not turn off within 8.5 seconds after the auto shut off signal is sent to the main switch. – Possible Cause – • Defective main switch • Poor connection of main switch relay harness	

17. PREVENTIVE MAINTENANCE SCHEDULE

17.1 PM TABLE

The DF section has been changed.

The copier section is the same.

	EM	80 k	160k	Notes
DOCUMENT FEEDER (A662) (for originals)				
Transport Belt	C	R	R	Belt cleaner
Friction Belt	C	R	R	Belt cleaner
Pick-up Roller	C	C	C	Soft cloth dampened with water
Feed Roller	C	C	C	Soft cloth dampened with water

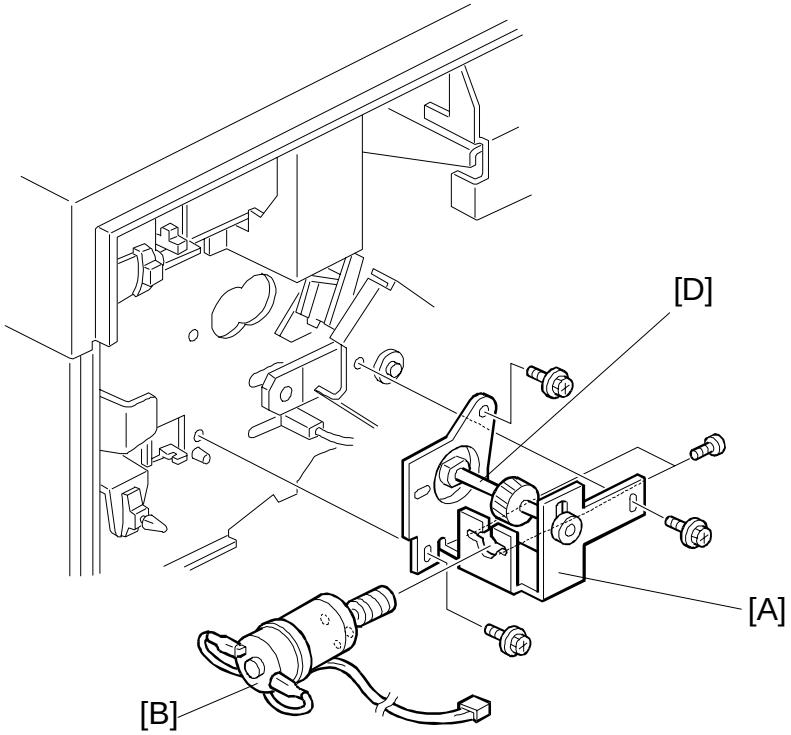
✻ The Transport Belt has been made a PM part.

✻ The cleaning method has been changed.

NOTE: Clean the Transport Belt and Friction Belt at the copier PM interval.

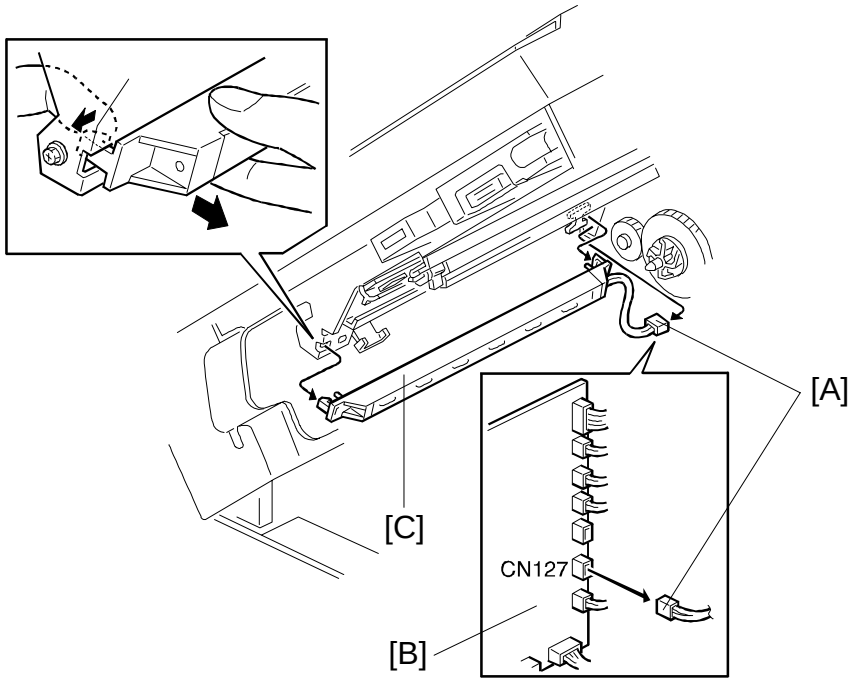
18. REPLACEMENT AND ADJUSTMENT

18.1 TONER SUPPLY MOTOR REPLACEMENT



1. Turn off the main switch.
2. Remove the upper rear cover and main control board (all connectors and 4 locking supports).
3. Remove the toner supply motor bracket [A] (3 screws).
4. Remove toner supply motor gear shaft assy. [D] (2 e-clips).
5. Remove the motor [B] from the bracket (2 screws).

18.2 QUENCHING LAMP REPLACEMENT



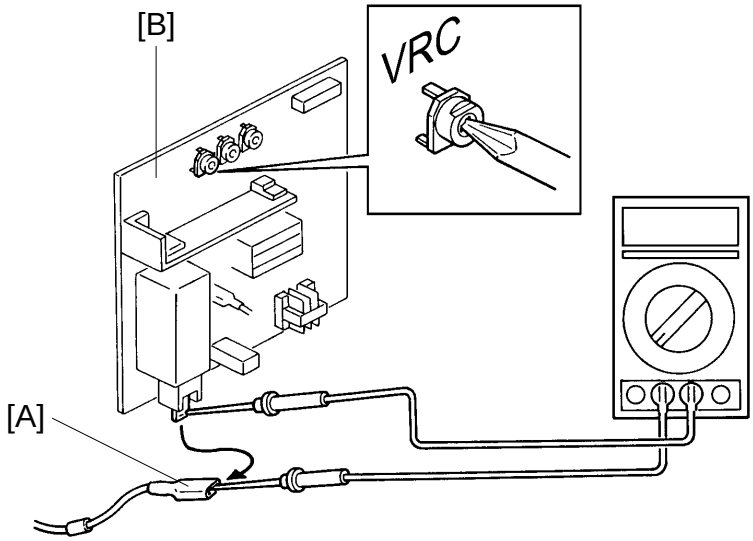
1. Open the front cover.
2. Remove the following parts:
   - Inner cover (Refer to Inner Cover Removal procedure).
   - Development unit (Refer to the Development Unit Removal procedure).
   - Cleaning unit (Refer to the Cleaning Unit Removal procedure).
   - Charge corona unit (Refer to the Charge Corona Removal procedure).
   - Upper rear cover (Refer to the Upper Cover Removal procedure).
3. Hold down the top of the upper unit and open the upper unit by pushing the release lever.
4. Remove the drum unit (2 screws).

   NOTE: Cover the drum with some sheets of paper to prevent the drum from being exposed to light.

6. Disconnect the connector [A] (CN127) from the main control board [B].
7. Remove the quenching lamp [C] from the copier frame as shown.

   NOTE: Do not use alcohol to clean the quenching lamp. This damages the resin in the covers of the LEDs.

18.3 CHARGE CORONA CURRENT ADJUSTMENT



ADJUSTMENT STANDARD	Adjusting VR	SP Mode
DC –400 ± 3 μA	VRC	SP9-2

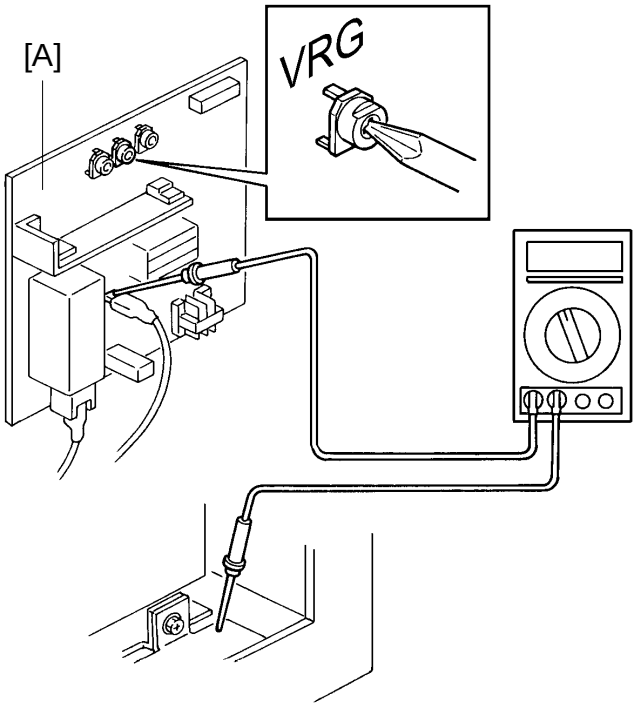
NOTE: 1) VRC on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRC when the CC/Grid/Bias power pack is replaced.

2) Keep the high voltage wire terminal [A] away from the copier frame. Otherwise, electrical leakage may interfere with current measurement.

1. Turn off the main switch.
2. Disconnect the charge corona terminal [A] from the CC/Grid/Bias power pack [B].
3. Select the dc 2 mA range on the digital multimeter.
4. Connect the multimeter leads as shown, then measure the charge corona current.

   NOTE: Keep the multimeter leads away from the main board.
5. Turn on the main switch, close the front cover safety switch and turn on the charge corona using SP9-2.
6. Adjust the charge corona current to –400 ± 3 μA by turning VRC on the CC/Grid/Bias power pack.
7. Press the C/⊘ key and turn off the main switch.

18.4 GRID VOLTAGE ADJUSTMENT (SP9-46)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode
DC –760 ± 10 Vdc	VRG	SP9-46

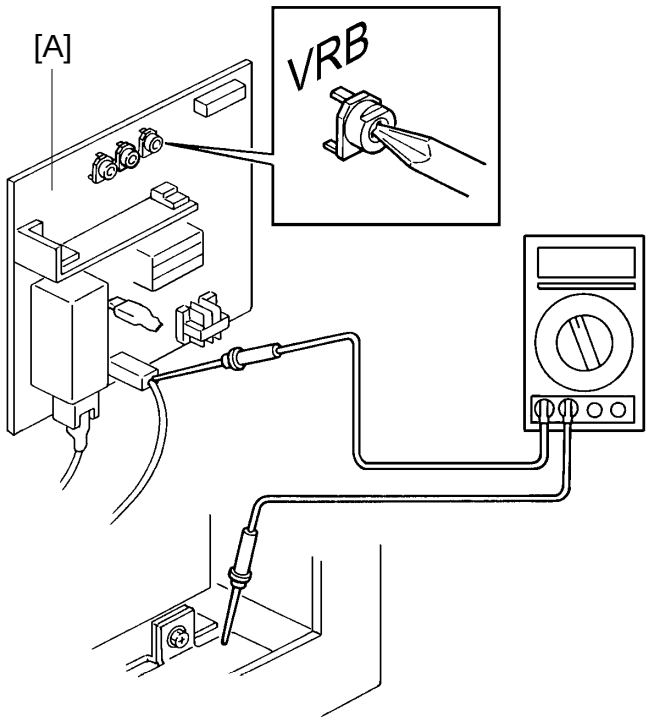
NOTE: VRG on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRG when the CC/Grid/Bias power pack is replaced.

1. Set the multimeter range to dc 1,500 V and connect the multimeter leads as shown.

   NOTE: Keep the multimeter leads away from the main board.

2. Turn on the main switch, close the front cover safety switch, and turn on the grid voltage using SP9-46.
3. Adjust the grid voltage to –760 ± 10 V by turning VRG on the CC/Grid/Bias power pack [A].
4. Press the C/⊘ key and turn off the main switch.

18.5 DEVELOPMENT BIAS VOLTAGE ADJUSTMENT (SP9-38)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode
DC –500 ± 10 V	VRB	SP9-38

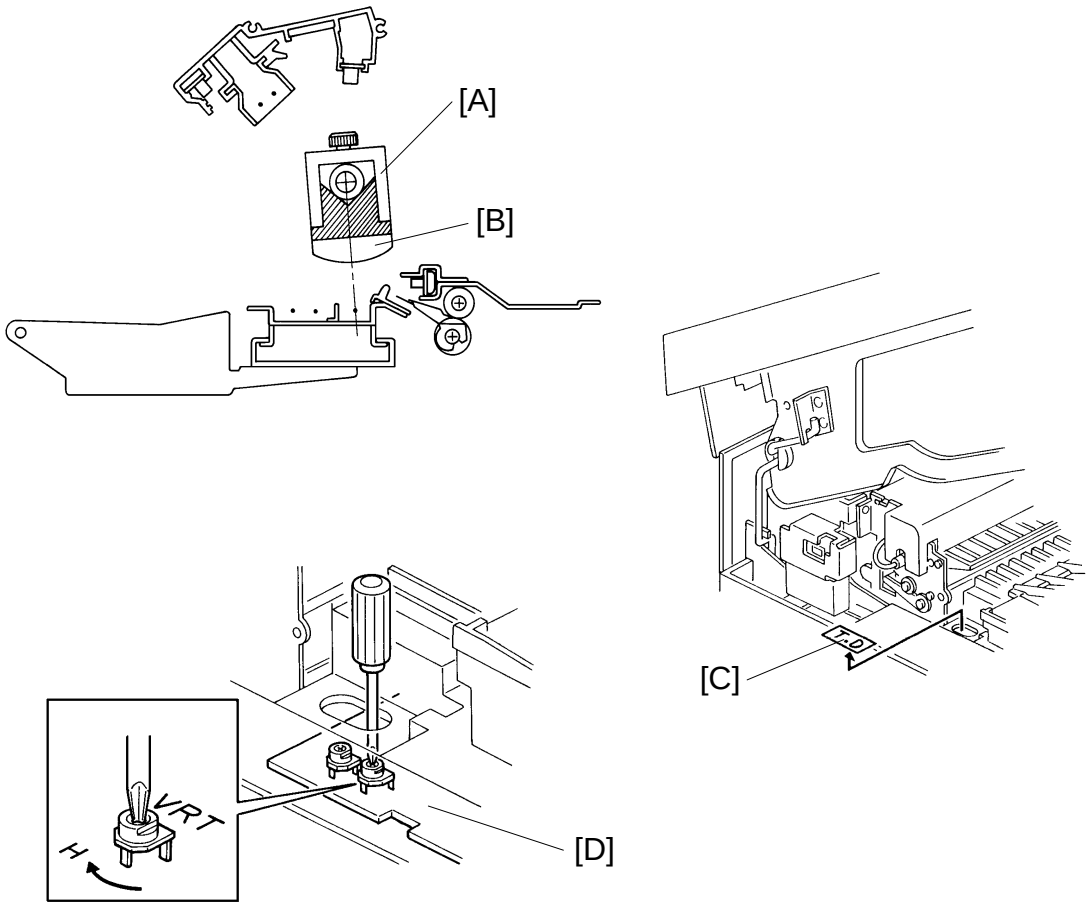
NOTE: VRB on the CC/Grid/Bias power pack spare parts is pre-adjusted. Usually it is not necessary to adjust VRB when the CC/Grid/Bias power pack is replaced.

1. Set the multimeter range to dc 1,500 V and connect the multimeter leads as shown.

   NOTE: Keep the multimeter leads away from the main board.

2. Turn on the main switch, close the front cover safety switch, then turn on the development bias using SP9-38.
3. Adjust the development bias voltage to –500 ± 10 V by turning VRB on the CC/Grid/Bias power pack [A].
4. Press the C/⊘ key and turn off the main switch.

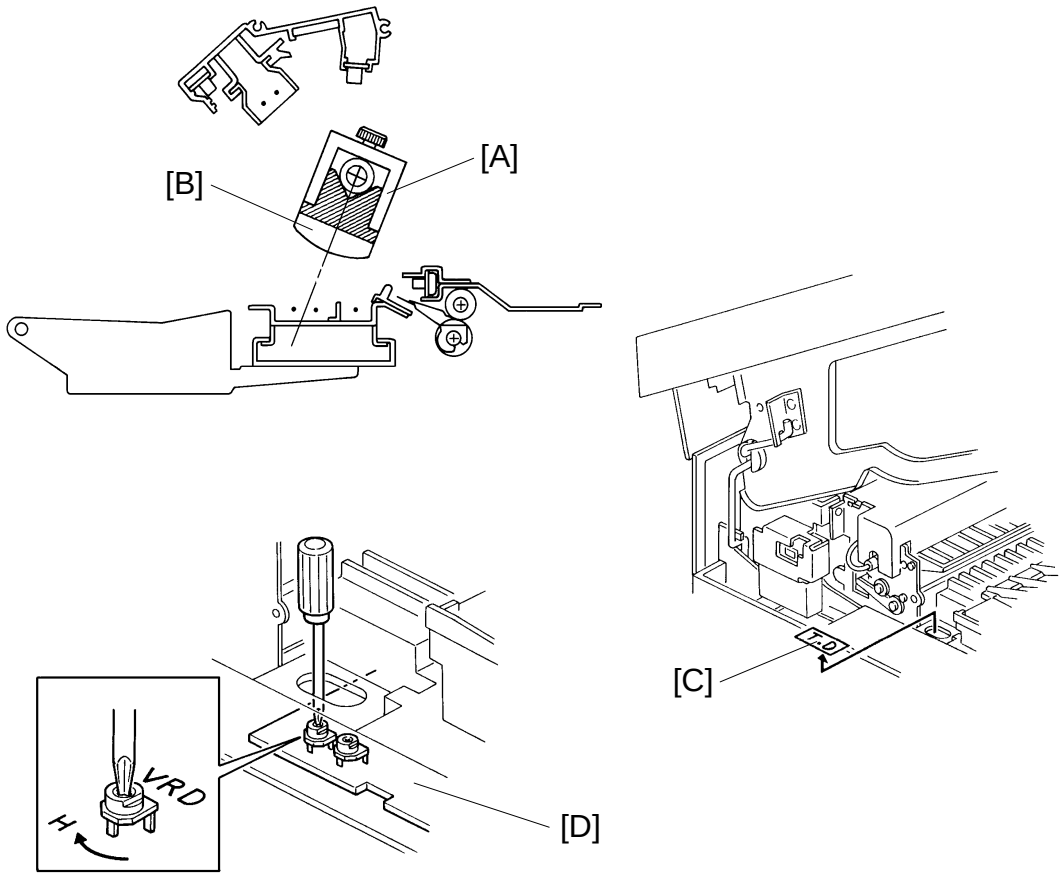
18.6 TRANSFER CORONA CURRENT ADJUSTMENT (SP9-5)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode
DC –31.0 ± 0.5 μA	VRT	SP9-5

1. If previously removed, reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current detection plate [B] is aligned with the transfer corona wire as shown.
2. Remove the seal [C] from the transport unit.
3. Select the dc 200 μA range on the digital multimeter.
4. Turn on the main switch, close the front cover safety switch, and turn on the transfer corona using SP9-5.
5. Adjust the transfer corona current to dc –31.0 ± 0.5 μA using VRT on the TC/SC power pack [D].
6. Press the C/◇ key and turn off the main switch.

18.7 SEPARATION CORONA CURRENT ADJUSTMENT (SP9-6)



ADJUSTMENT STANDARD	Adjusting VR	SP Mode
AC 49 ± 1.0 μA	VRD	SP9-6

1. If previously removed, reinstall the TC/SC corona unit and position the drum shoe [A] on the center of the shaft so that the axis of the current detection plate [B] is aligned with the separation corona wire as shown.

   NOTE: Make sure that the drum shoe does not touch the pick-off pawls.

2. Remove the seal [C] from the transport unit.

3 Select the ac 200 μA range on the digital multimeter.

4. Turn on the main switch, close the front cover safety switch, and turn on the separation corona using SP9-6.

5. Adjust the separation corona current to ac 49 ± 1.0 μA using VRD on the TC/SC power pack [D].

6. Press the C/⊘ key and turn off the main switch.

DOCUMENT FEEDER
A662

1. SPECIFICATIONS

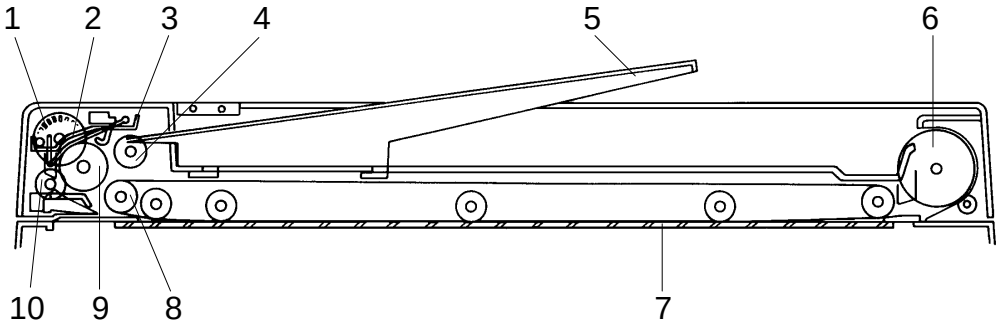
Original Size:	Maximum: A3 or 11" x 17" Minimum: A5 Lengthwise or 5 1/2" x 8 1/2"
Original Weight:	52 to 105 g/m^2 (14 to 28 lb)
Original Feed:	Automatic Feed - ADF mode Semi-automatic Feed - SADF mode
Original Tray Capacity:	30 sheets - 80 g/m^2 (20 lb)
Original Set:	Face up, first sheet on top
Original Separation:	Feed roller and friction belt
Original Transport:	One flat belt
Copying Speed:	13 copies/minute (A4 lengthwise or 8 1/2" x 11" lengthwise)
Power Consumption:	45 W
Dimensions (W x D x H):	590 x 443 x 87.5 mm (23.3" x 17.5" x 3.4") (Not including the original table)
Weight:	Approximately 7 kg (15.5 lb)

NOTE:

- The A662 (DF44) document feeder can only be installed on the A203 copiers.
- Specifications are subject to change without notice.
- PM items for the document feeder can be found on the PM Table on page 8-51

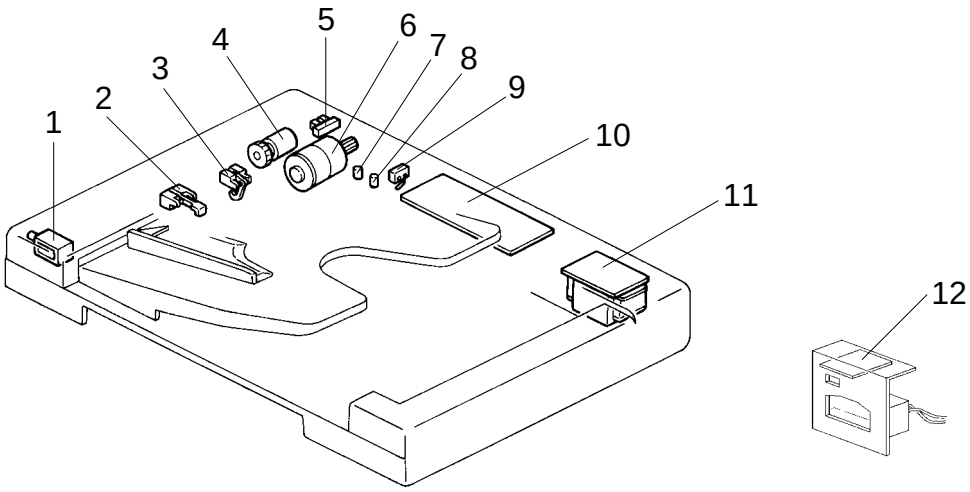
2. COMPONENT LAYOUT

2.1 MECHANICAL COMPONENTS



1. Pulse Generator Disk
2. Friction Belt
3. Pick-up Lever
4. Pick-up Roller
5. Original Table
6. Exit Roller
7. Transport Belt
8. Transport Belt Roller
9. Feed Roller
10. Relay Roller

2.2 ELECTRICAL COMPONENTS

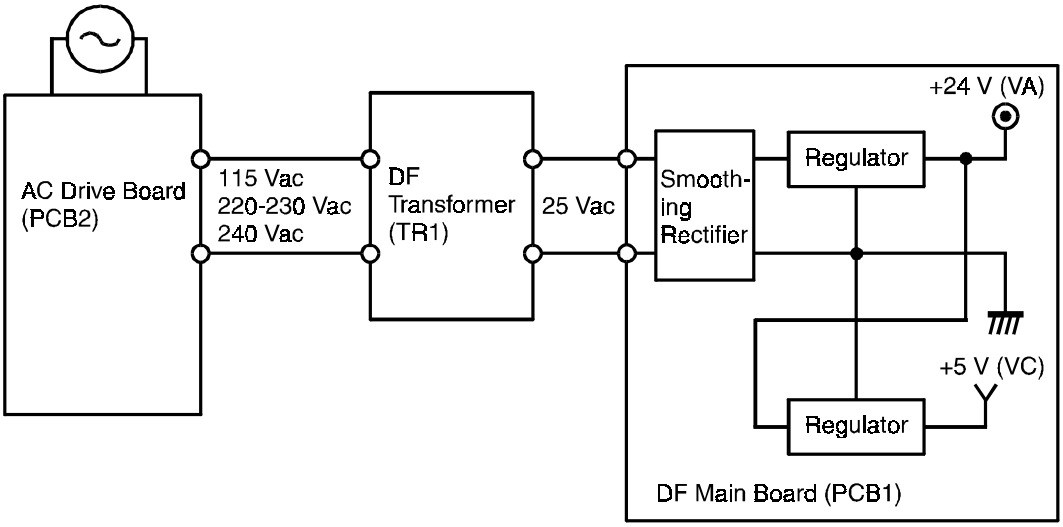


1. Pick-up Solenoid
2. Registration Sensor
3. Original Set Sensor
4. Feed Clutch
5. Pulse Generator Sensor
6. DF Motor
7. Insert Original Indicator
8. SADF Indicator
9. Lift Switch
10. DF Main Board
11. DF Transformer
12. DF Interface Board

3. ELECTRICAL COMPONENT DESCRIPTIONS

Symbol	Name	Function	Index No.
Motor			
M1	DF Motor	Drives all the document feeder components.	6
Solenoid			
SOL1	Pick-up Solenoid	Energizes to press the pick-up lever against the stack of originals in preparation for original feed-in.	1
Clutch			
CL1	Feed Clutch	Turns on to transmit main motor rotation to the feed roller.	4
Switch			
SW1	Lift Switch	Informs the CPU when the DF is lifted and also serves as the misfeed reset switch for the DF.	9
Sensors			
S1	Pulse Generator Sensor	Supplies timing pulses to the DF main board.	5
S2	Original Set Sensor	Informs the copier CPU that originals have been placed and causes the Insert Original indicator to go out.	3
S3	Registration Sensor	Sets original stop timing and checks for original misfeeds.	2
Printed Circuit Board			
PCB1	DF Main Board	Controls all DF functions.	10
PCB2	DF Interface Board	Interfaces between the copier main board and the DF.	12
Transformer			
TR1	DF Transformer	Steps down the wall voltage to 25 volts ac.	11
LEDs			
LED1	SADF Indicator	Informs the operator that the SADF mode is available.	8
LED2	Insert Original Indicator	Turns off when the originals are inserted into the original table.	7

4. POWER DISTRIBUTION



The document feeder uses two dc power levels: +24 volts, and +5 volts.

When the main switch is turned on, the DF transformer receives the wall outlet ac power through the ac drive board and outputs 25 volts ac to the DF main board. Then, the dc power supply circuit on the DF main board converts the 25 volts ac input to +24 volts and +5 volts.

+24 volts is used by the DF motor, the pick-up solenoid, and the feed clutch. +5 volts is used by other electrical components.

5. BASIC OPERATION

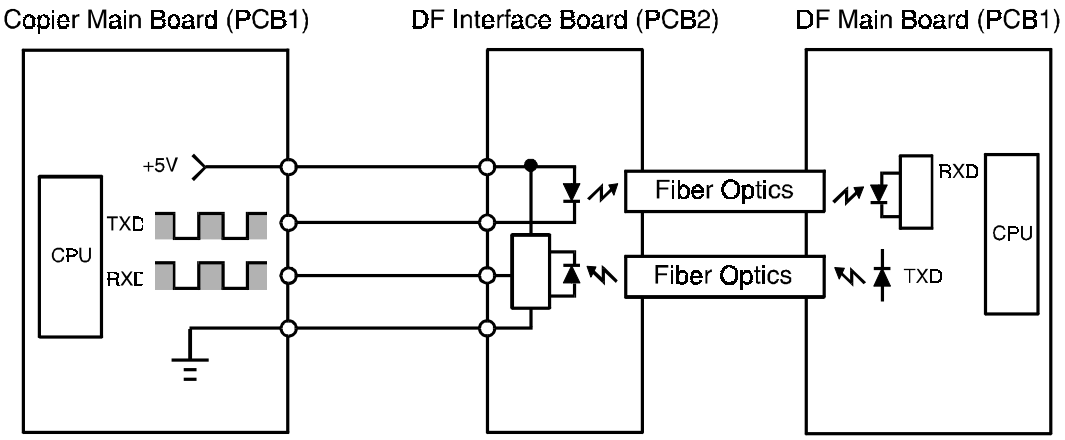
When the main switch is turned on, the DF CPU sends the "DF installed" signal to the copier CPU. Receiving this signal, the copier CPU recognizes that the document feeder is installed and sends the "DF confirmed" signal to the DF CPU.

When originals are placed on the original table, the Insert Original indicator turns off and the DF CPU sends the "original set" signal to the copier CPU to inform that the originals have been set.

When the ⧫ key is pressed, the copier CPU sends the "feed-in" signal to the document feeder. On receipt of this signal, the DF CPU first energizes the DF motor, then the pick-up solenoid and feed clutch to feed in the bottom sheet of the original stack onto the exposure glass. The pick-up solenoid and the feed clutch remain energized until the original's leading edge reaches the registration sensor. The DF motor turns off shortly after the original's trailing edge passes the registration sensor. Then, the DF motor pauses and reverses for a moment to align the edge of the original with the scale.

Then the scanner starts to move (scanner start timing does not depend on the progress of the original through the DF; it starts at a fixed time after the ⧫ key is pressed). When the scanner reaches the return position, the copier CPU sends the "original change" signal to the DF CPU in order to feed out the current original and feed in the next original.

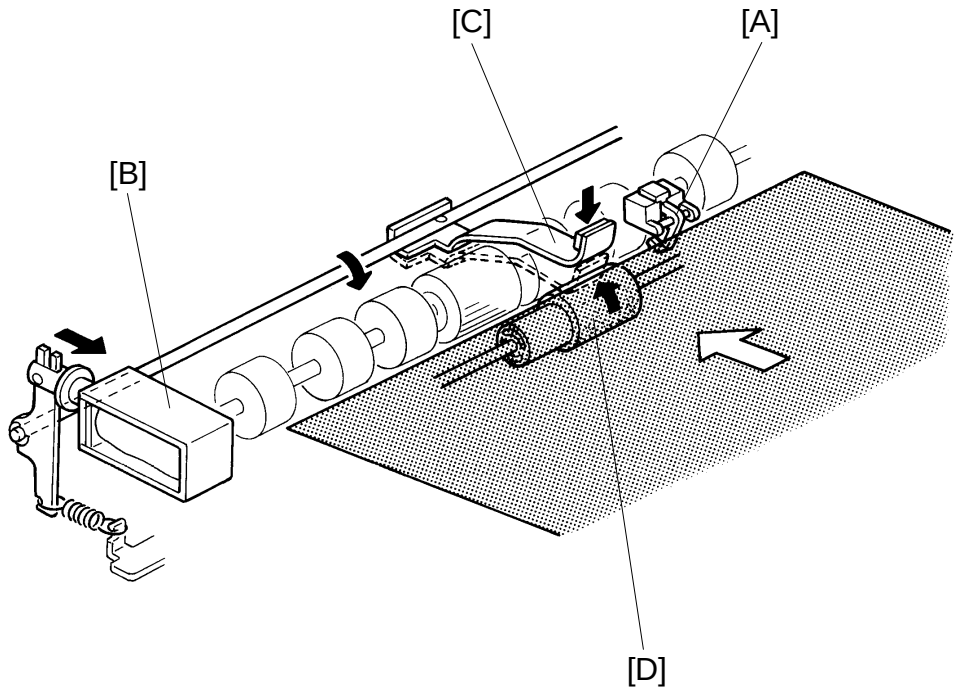
6. INTERFACE CIRCUIT



The copier CPU and the DF CPU communicate via the interface board using fiber optics. The interface board changes the optical signals to electrical signals (and vice versa).

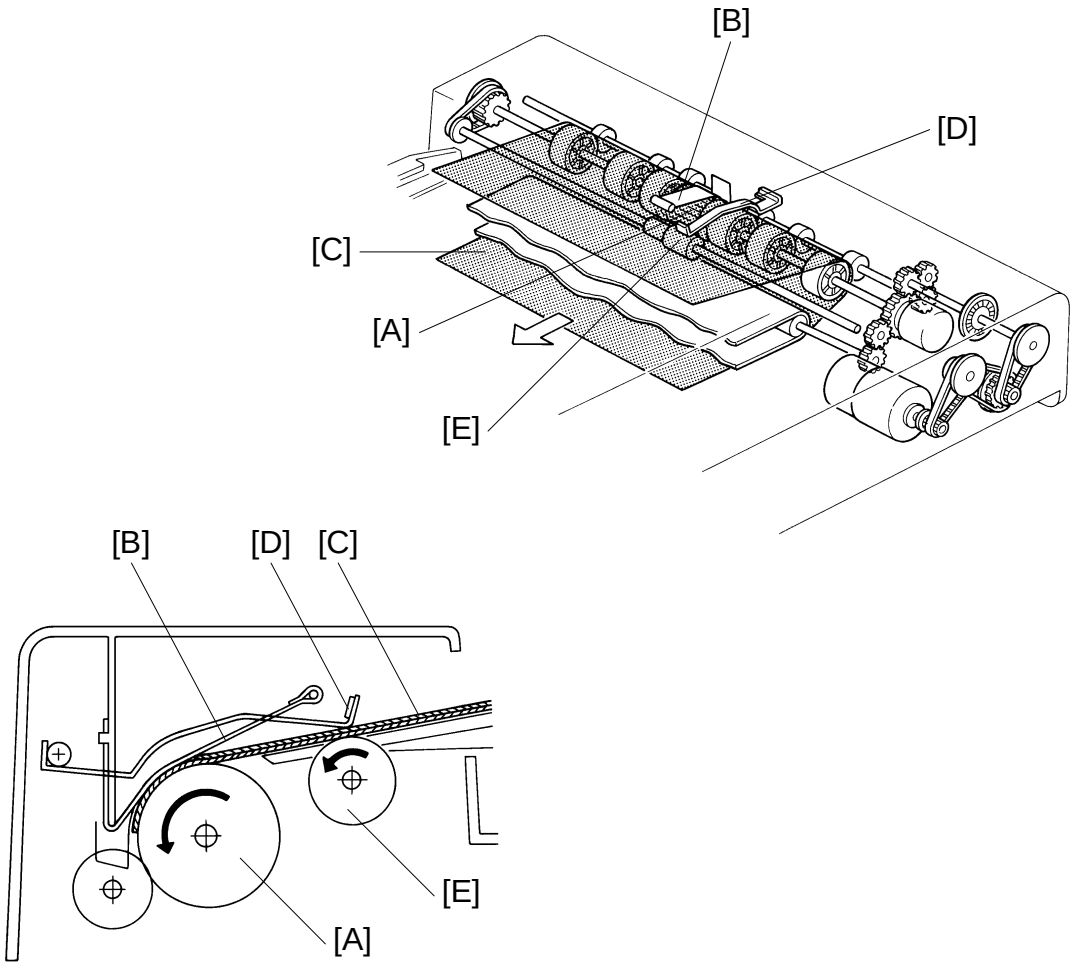
7. ORIGINAL FEED

7.1 ORIGINAL PICK-UP MECHANISM



After setting the originals on the original table, the originals contact the feeler [A] of the original set sensor and cause the feeler to move out of the sensor. The DF CPU then sends the original set signal to the copier CPU to inform it that the document feeder will be used. When the ◇ key is pressed, the pick-up solenoid [B] is energized. The original stack is then pressed between the pick-up lever [C] and pick-up roller [D]. The rotation of the pick-up roller advances the bottom original.

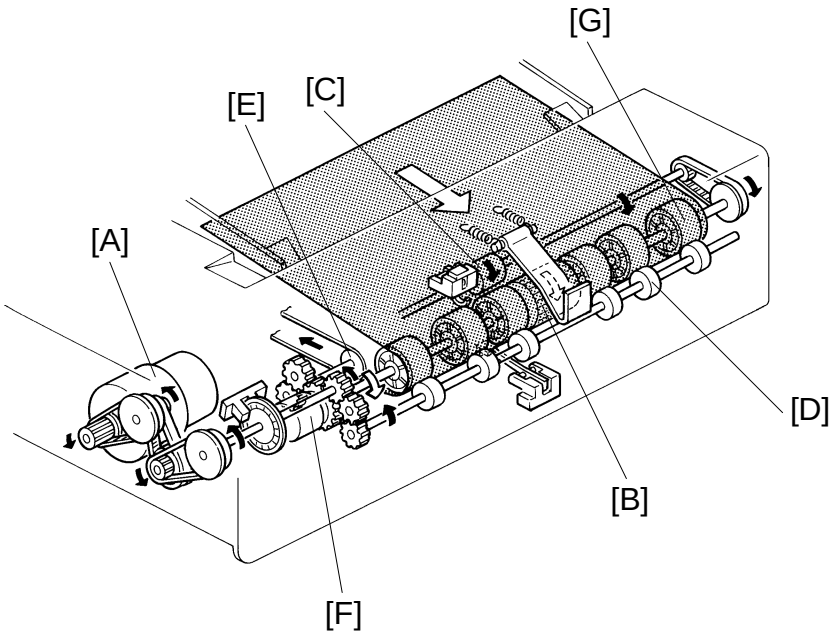
7.2 ORIGINAL SEPARATION MECHANISM



The feed roller [A] and the friction belt [B] are used to feed in and separate the originals [C]. Only the bottom original is fed because the friction belt prevents any other originals from feeding.

Original feed starts when the pick-up lever [D] presses the original stack and the pick-up roller [E] advances the bottom original of the stack. The feed roller moves the original past the friction belt because the driving force of the feed roller is greater than the resistance of the friction belt. The friction belt prevents multiple feeds because the resistance of the friction belt is greater than the friction between original sheets.

7.3 ORIGINAL FEED-IN MECHANISM



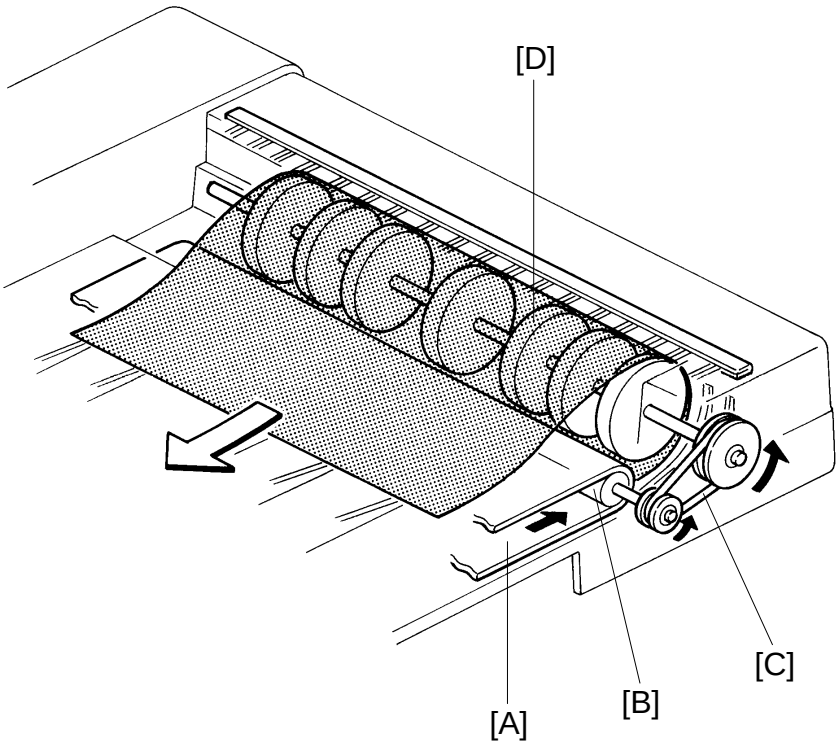
The DF motor [A] drives the feed roller [B], the pick-up roller [C], the relay rollers [D], and the transport belt roller [E] via timing belts and a gear train. The feed roller and the pick-up roller are controlled by the feed clutch [F], but the relay rollers and the transport roller are directly driven by the DF motor. The idler rollers [G] on the feed roller shaft are free from the shaft.

When the ◇ key is pressed, the DF motor is energized and the relay rollers and transport belt roller start turning. 100 milliseconds after the DF motor starts turning, the pick-up solenoid and the feed clutch are energized. The pick-up and feed rollers then start turning and carry the original between the relay rollers and the idler rollers. The pick-up solenoid and the feed clutch are de-energized when the original's leading edge passes through the registration sensor.

The DF motor remains energized to deliver the original to the exposure glass until a certain number of pulses (10 to 25 pulses) after the original's trailing edge passes through the registration sensor. Then, the DF motor pauses and reverses for 15 pulses to align the edge of the original with the scale.

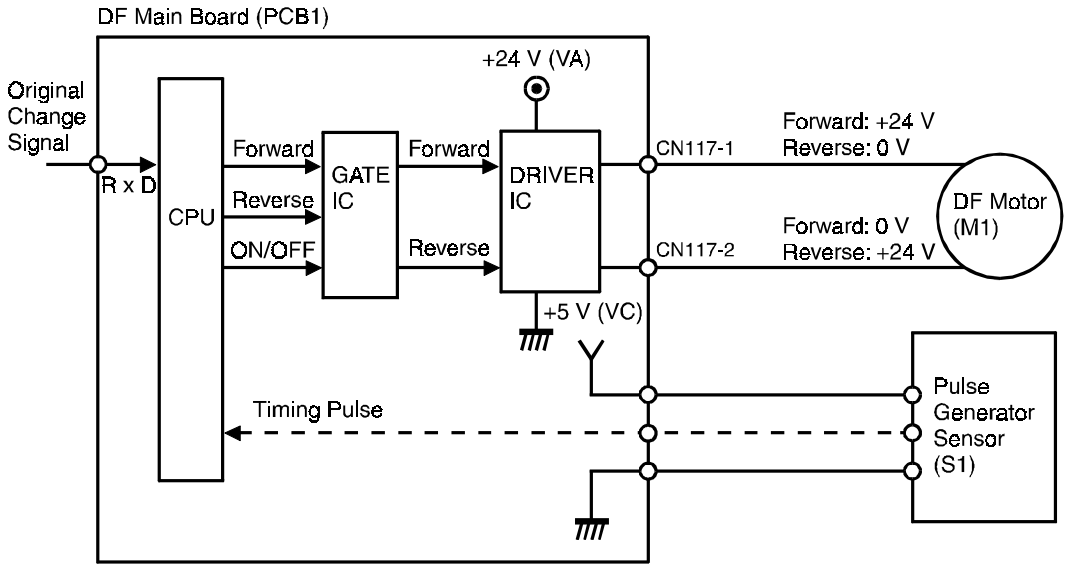
To feed the second original, the DF motor starts rotating when the scanner reaches the return position. (The copier CPU sends the original change signal to the DF CPU.) At this time, the transport belt starts carrying the first original on the exposure glass to the exit roller. The timing for when the pick-up solenoid and the feed clutch are energized for the second original depends on the length of the first original detected by the registration sensor.

7.4 ORIGINAL FEED-OUT MECHANISM



The exit rollers [D] are driven by the DF motor through a series of gears, the transport belt [A], the transport belt roller [B], and the exit roller drive belt [C]. When the DF CPU receives the original change signal from the copier CPU, the DF motor starts turning. The transport belt carries the original to the exit rollers [D] and the exit rollers complete the original feed-out.

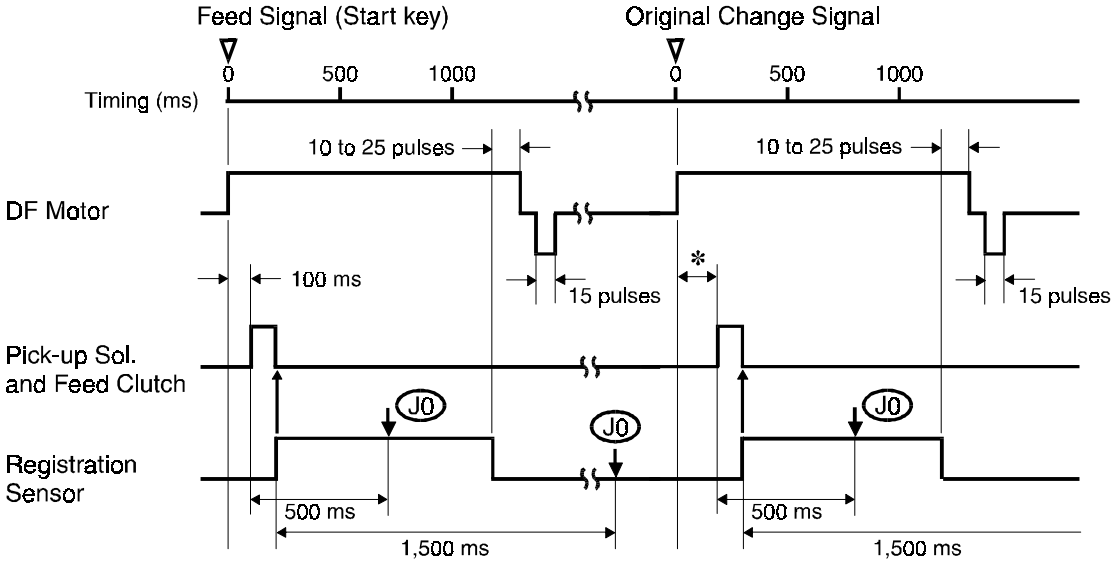
7.5 DF MOTOR CIRCUIT



The DF motor is a 24 volt dc motor. When the CPU receives the feed signal from the copier, the CPU outputs the ON signal and the Forward signal to the gate IC. On receipt of the forward signal from the gate IC, the driver IC outputs 24 volts to CN117-1 and 0 volts to CN117-2. This causes the DF motor to start turning in the forward direction.

Within 10 to 25 pulses after the original's trailing edge passes through the registration sensor, the CPU stops sending the ON signal and the Forward signal. The DF motor stops turning. Then the CPU outputs the ON signal and the reverse signal for 15 pulses. Then the driver IC outputs 0 volts to CN117-1 and +24 volts to CN117-2 to reverse the DF motor.

7.6 ORIGINAL FEED AND MISFEED DETECTION TIMING



*: The timing depends on the length of the first original.

The above chart shows the original feed timing for A4 lengthwise or 8.5" x 11" originals, and the misfeed detection timing.

The registration sensor is used for misfeed detection. If the DF CPU detects a misfeed, the DF CPU lights the Original Misfeed indicator and sends the original misfeed signal to the copier CPU. Then the copier CPU lights the Check Paper Path and Misfeed Location (J0) indicators on the operation panel.

When the main switch is turned on, the DF CPU checks the registration sensor output for initial original misfeed.

During original feed-in, the DF CPU performs two types of original misfeed detection:

1. Whether the registration sensor is actuated within 500 milliseconds after the pick-up solenoid and the feed clutch turn on.
2. Whether the original has passed through the registration sensor 1,500 milliseconds after the registration sensor has been actuated.

8. SERVICE TABLES

8.1 DIP SWITCHES

DPS 1				Function
1	2	3	4	
0	0	0	0	Normal Setting
1	0	0	1	Free Run
0	0	1	1	Solenoid Test
1	1	0	1	Motor Test
1	1	1	1	All Indicators On

NOTE: All the functions are executed when the DF is closed.

8.2 VARIABLE RESISTORS

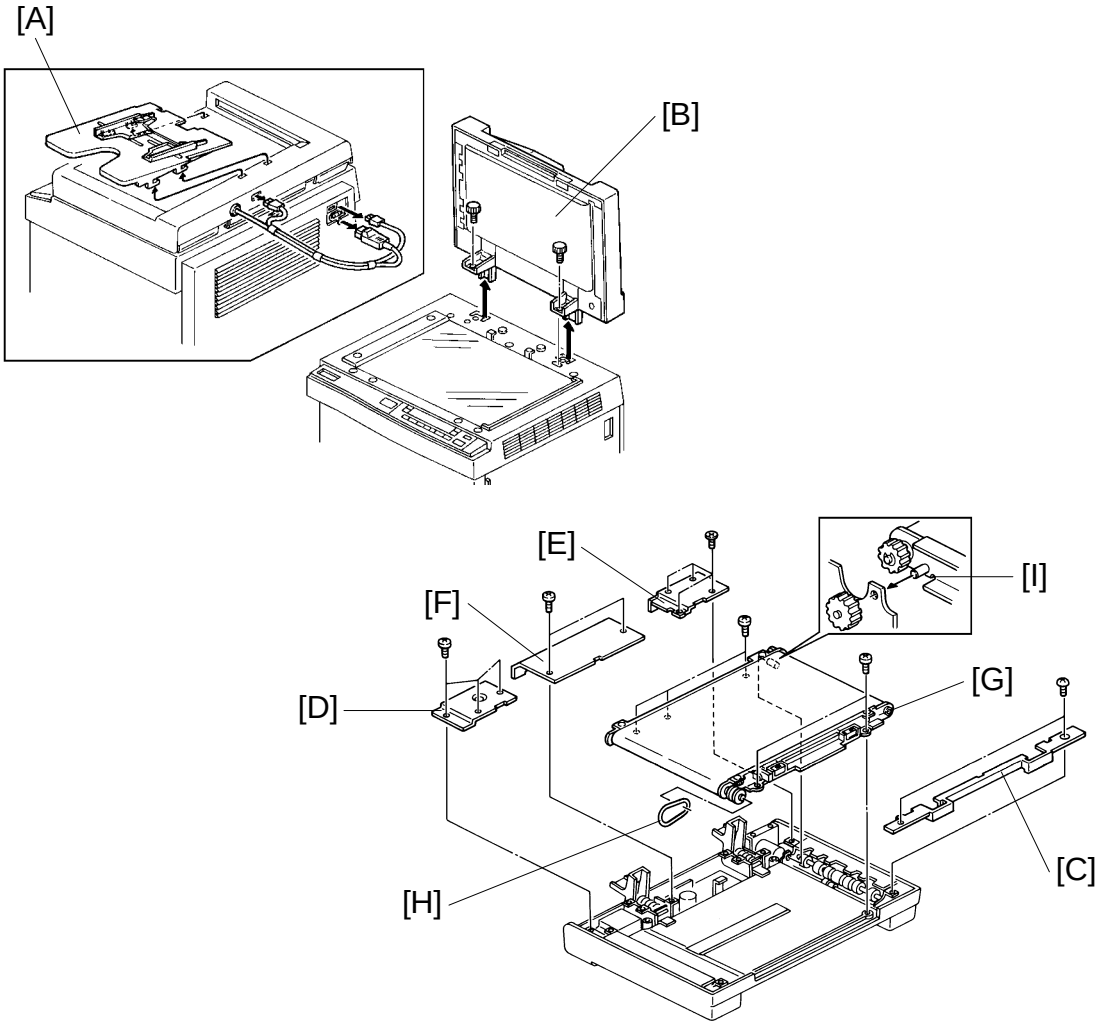
VR No.	Function
VR1	Adjusts registration

8.3 FUSE

Fuse No.	Rating	Blown Fuse Condition
F1	F2 A/250 V	The DF will not operate.

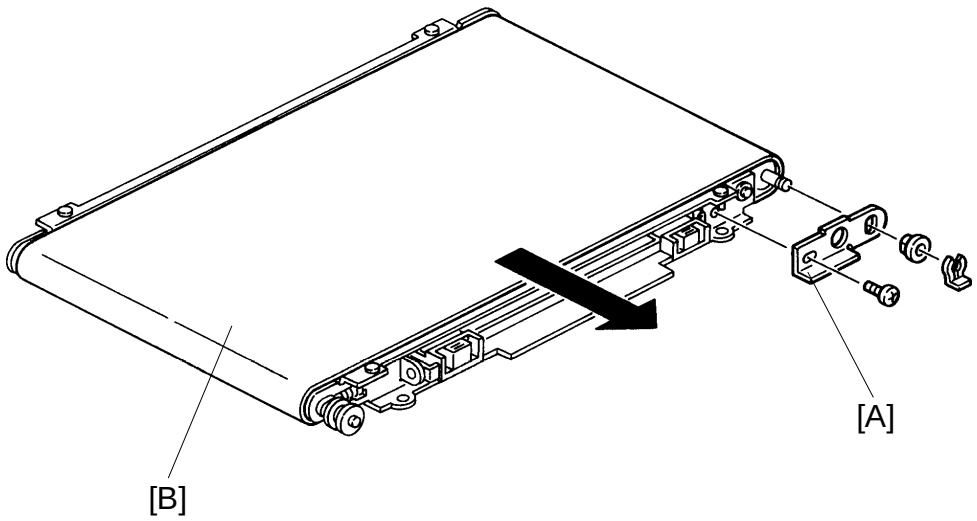
9. REPLACEMENT AND ADJUSTMENT

9.1 TRANSPORT BELT REPLACEMENT



1. Turn off the main switch.
2. Remove the original table [A].
3. Remove the DF [B] from the copier (2 knob screws, 1 power supply cord, and 1 optics harness).
4. Remove the grip guide [C] (2 screws).
5. Remove the transformer cover [D] (3 screws), DF motor cover [E] (4 screws) and main board cover [F] (2 screws).
6. Remove the transport belt assembly [G] (5 screws and 1 drive belt [H]).

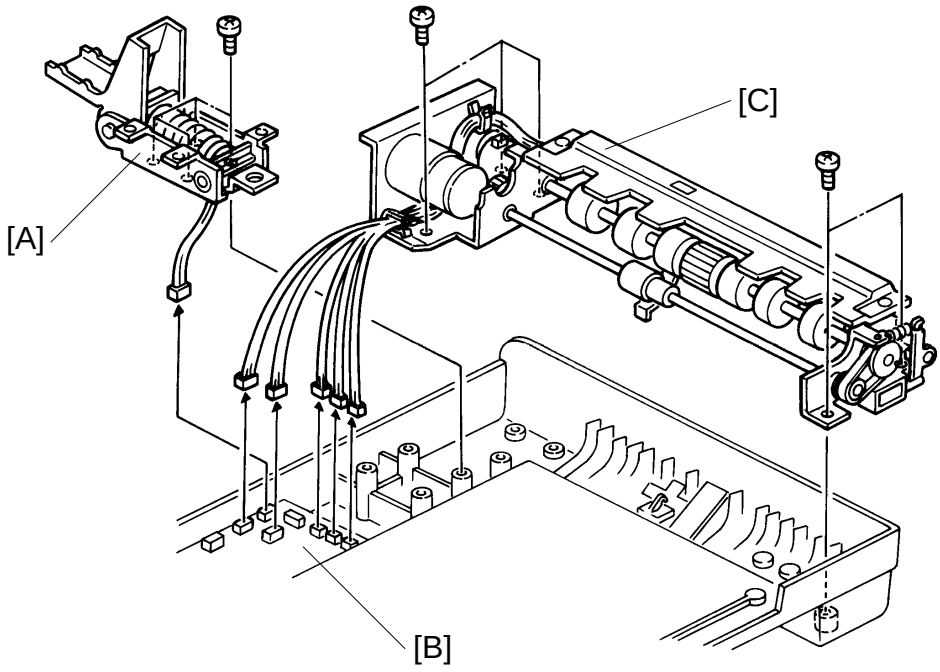
   NOTE: When installing the transport belt assembly, make sure that the positioning pin [I] fits into the DF frame.



7. Remove the transport roller holder [A] (1 screw, 1 snap ring and 1 bearing).
8. Pull out the transport belt [B].

   NOTE: After reinstalling the transport belt, make sure that the bushings of the transport rollers are set correctly and the transport belt turns smoothly.

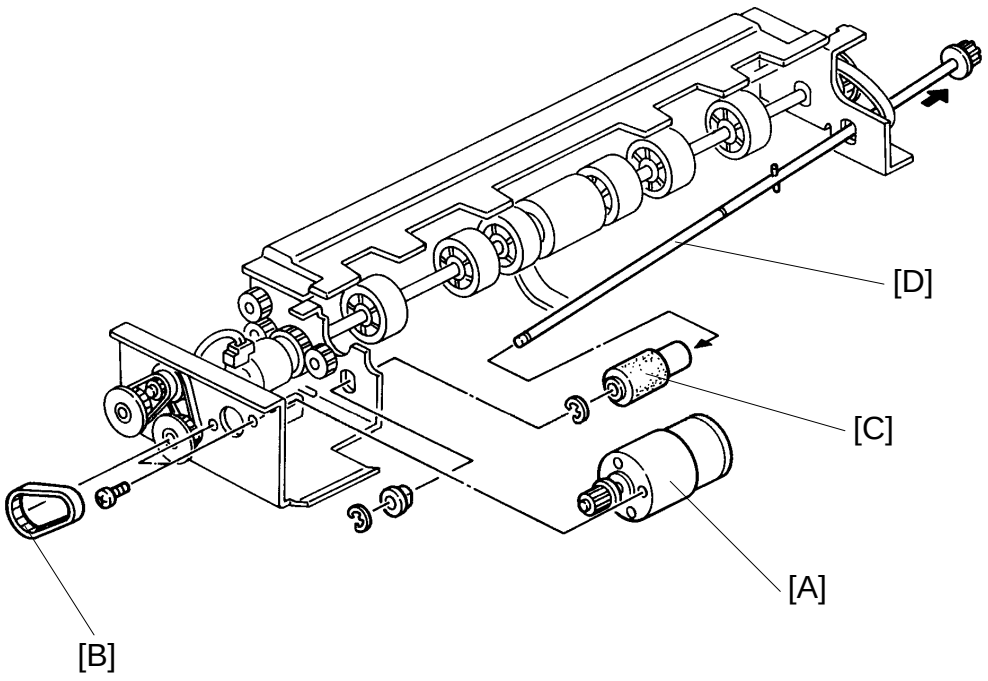
9.2 FEED-IN UNIT REMOVAL



1. Turn off the main switch.
2. Remove the transport belt assembly. (See Transport Belt Replacement.)
3. Remove the left hinge bracket [A] (4 screws and 1 connector).
4. Disconnect five connectors from the main board [B] (CN111, CN113, CN115, CN116 and CN117).
5. Remove the feed-in unit [C] (5 screws).

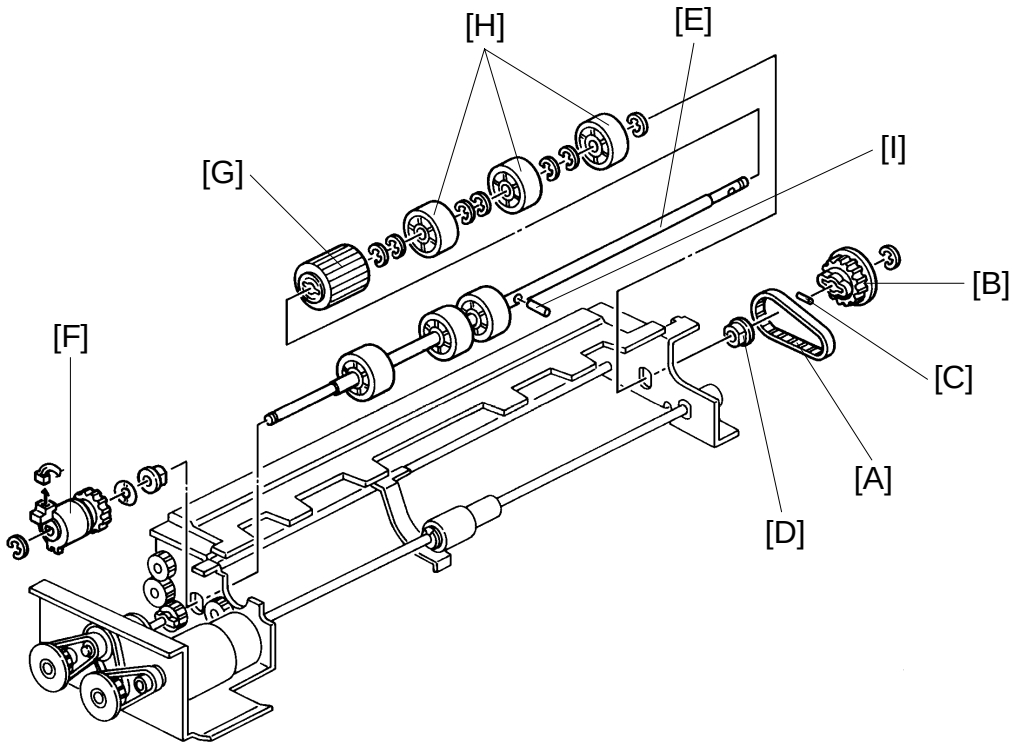
   NOTE: When reinstalling the feed-in unit, the harness must be positioned underneath the right hinge bracket.

9.3 PICK-UP ROLLER REPLACEMENT



1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Remove the DF motor [A] (2 screws and 1 timing belt [B]).
4. Remove the pick-up roller [C] (2 E-rings and 1 bushing) from the shaft [D].

9.4 FEED ROLLER REPLACEMENT

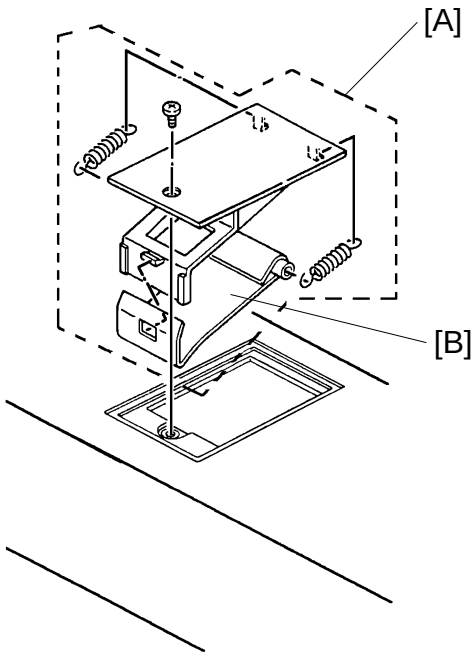


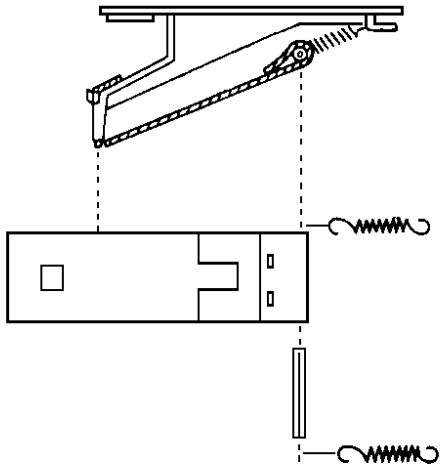
1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Remove the feed roller timing belt [A], feed roller gear [B] (1 E-ring and 1 spring pin [C]) and 1 bushing [D].

   NOTE: Be careful not to lose the spring pin.
4. Slide the feed roller shaft [E] towards the front and remove the feed clutch [F] (1 E-ring and 1 connector).
5. Take out the feed roller shaft (1 spacer and 1 bushing ----- from the rear side).
6. Remove the feed roller [G] from the shaft (3 idler rollers [H], 7 E-rings and 1 spring pin [I]).

   NOTE: Be careful not to lose the spring pin.

9.5 FRICTION BELT REPLACEMENT

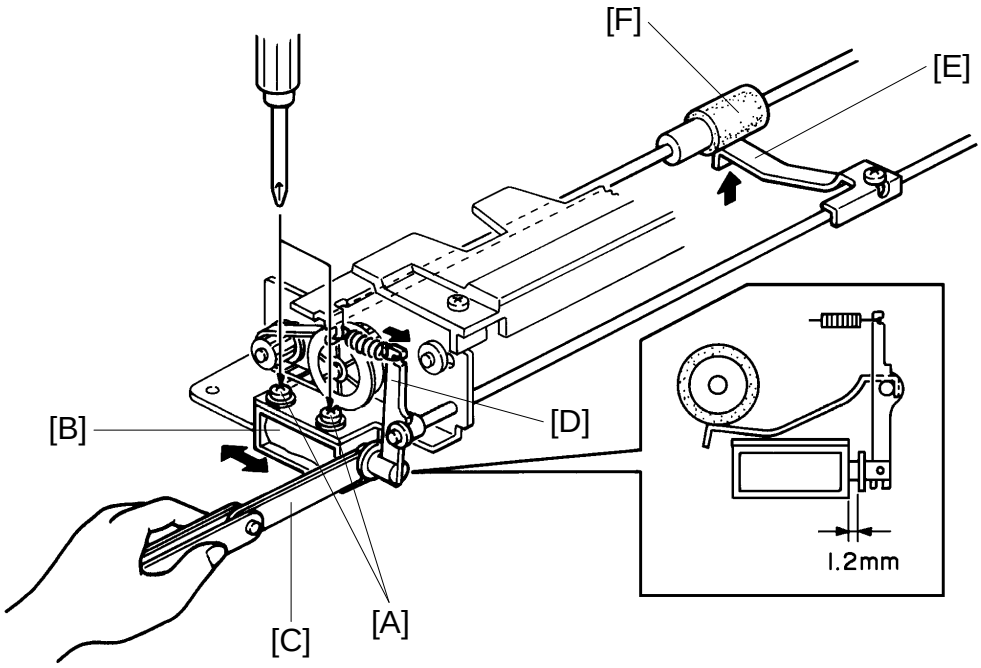




1. Turn off the main switch.
2. Remove the friction belt assembly [A] (1 screw).
3. Remove the friction belt [B] (2 springs, 1 pin).

NOTE: When installing the friction belt assembly, make sure the fiction belt roller is set in the correct position. (See the illustration.)

9.6 PICK-UP SOLENOID ADJUSTMENT



1. Turn off the main switch.
2. Remove the feed-in unit. (See Feed-in Unit Removal.)
3. Loosen two screws [A] securing the pick-up solenoid [B].
4. Place a 1.2 mm thickness gauge [C] between the plunger and the solenoid.
5. Turn the solenoid lever [D] clockwise until the plunger touches the thickness gauge. Just at this point, tighten two screws.
6. Make sure that the pick-up lever [E] is touching the pick-up roller [F] when the plunger is pushed. If not, repeat steps 3 to 5.
7. Reassemble the DF.
8. Turn on the main switch and check the original feed-in operation.

TECHNICAL SERVICE BULLETINS

BULLETIN NUMBER: 3013/3213-001 12/13/94
APPLICABLE MODEL: FT3013/3213

SUBJECT: FT3013/3213 UPPER CLAMSHELL COUNTERMEASURE

SYMPTOM:

The upper Clamshell springs open when unlatched (copier "jumps" off table).

CAUSE:

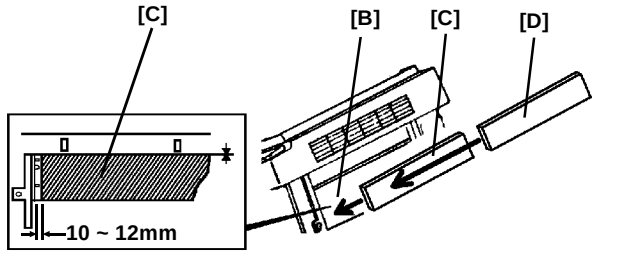
The strength of the torsion springs that hold the clamshell open is too great.

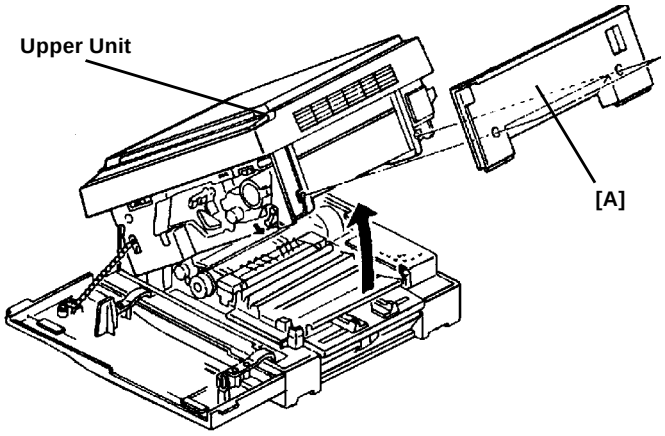
FIELD COUNTERMEASURE:

A Plate - 3.9 x 75 x 320mm (A1519900) has been prepared to add weight to the upper unit. Install two (2) of these Plates according to the following procedure:

CAUTION: Please exercise caution when handling the plates as the edges may be sharp.

1. While applying downward pressure to the Upper Unit, unlatch and raise the Upper Unit.
2. Remove the Right Cover [A] (2 screws).
3. Clean the Right Development Stay [B] with alcohol.
4. Peel off the seal from the Plate [C] and adhere the Plate onto the Right Development Stay.
5. Clean the surface of the Plate [C] with alcohol.
6. Peel off the seal from a second Plate [D] and adhere the Plate [D] to the first Plate [C].
7. Reassemble the machine.





ORDERING PROCEDURE:

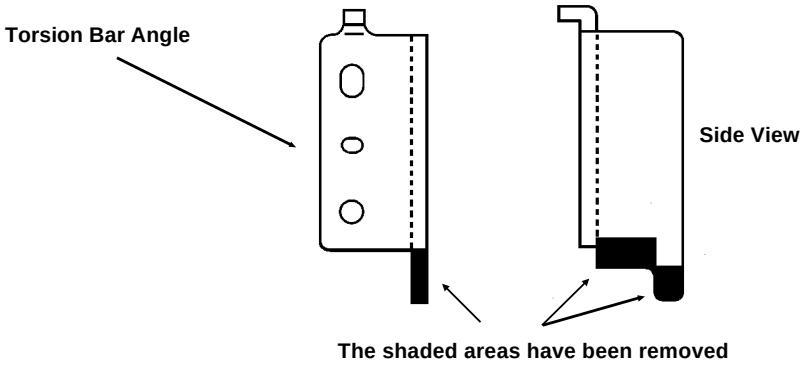
Ricoh Corporation will automatically ship two (2) Plates (A1519900) for use on 100% of all FT3013/3213 copiers manufactured prior to September, 1994 based on Ricoh's Equipment Shipped Records.

NOTE: *The plates are not necessary if a Document Feeder is installed.*

Continued...

TEMPORARY PRODUCTION COUNTERMEASURE:

The shaded areas of the Torsion Bar Angles have been removed to reduce the strength of the Torsion Springs.



Front Torsion Bar Angle (A0771108)

Rear Torsion Bar Angle (A0771098)

UNITS AFFECTED:

All FT3013/3213 copiers manufactured during September, 1994 thru November, 1994 will have the Torsion Bar Angles modified as illustarted above during production.

PERMANENT COUNTERMEASURE:

The Torsion Bar Angles will be modified so that the Torsion Spring strength is reduced. In addition, the new style Torsion Bar Brackets can be adjusted in four (4) increments. The strength of the Torsion Springs can be adjusted at installation or by a service representative upon customer demand.

UNITS AFFECTED:

All FT3013/3213 copiers manufactured during the month of December, 1994 and beyond will have the new style adjustable Torsion Bar Angles installed during production.

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213-001 REISSUE ★ **10/11/95**

APPLICABLE MODEL: FT3013/3213

Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: FT3013/3213 UPPER CLAMSHELL COUNTERMEASURE

SYMPTOM:

The upper Clamshell springs open when unlatched (copier "jumps" off table).

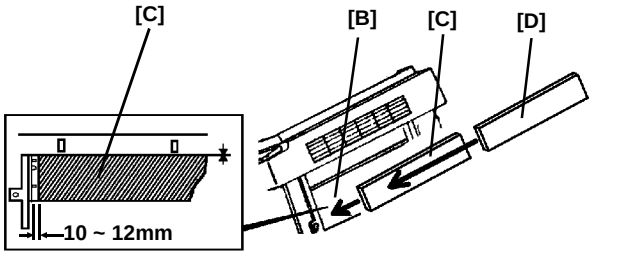
CAUSE:

The strength of the torsion springs that hold the clamshell open is too great.

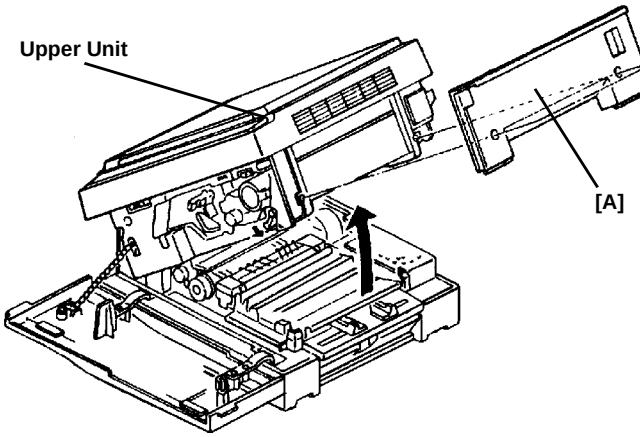
FIELD COUNTERMEASURE:

A Plate - 3.9 x 75 x 320mm (A1519900) has been prepared to add weight to the upper unit. Install two (2) of these Plates according to the following procedure:

CAUTION: Please exercise caution when handling the plates as the edges may be sharp.



1. While applying downward pressure to the Upper Unit, unlatch and raise the Upper Unit.
2. Remove the Right Cover [A] (2 screws).
3. Clean the Right Development Stay [B] with alcohol.
4. Peel off the seal from the Plate [C] and adhere the Plate onto the Right Development Stay.
5. Clean the surface of the Plate [C] with alcohol.
6. Peel off the seal from a second Plate [D] and adhere the Plate [D] to the first Plate [C].
7. Reassemble the machine.



ORDERING PROCEDURE:

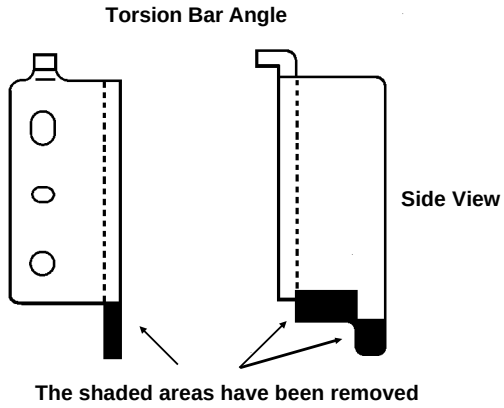
Ricoh Corporation will automatically ship two (2) Plates (A1519900) for use on 100% of all FT3013/3213 copiers manufactured prior to September, 1994 based on Ricoh's Equipment Shipped Records.

NOTE: *The plates are not necessary if a Document Feeder is installed.*

Continued...

TEMPORARY PRODUCTION COUNTERMEASURE:

The shaded areas of the Torsion Bar Angles have been removed to reduce the strength of the Torsion Springs.

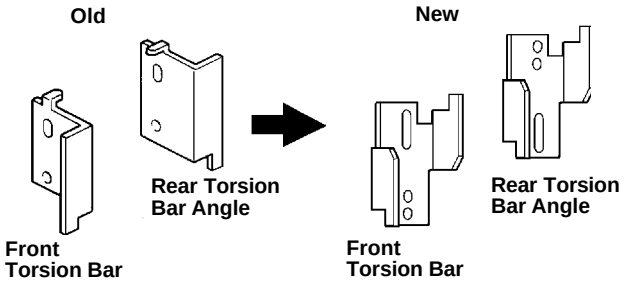


UNITS AFFECTED:

All FT3013/3213 copiers manufactured during September, 1994 thru November, 1994 will have the Torsion Bar Angles modified as illustrated during production.

★ PERMANENT COUNTERMEASURE:

To make it possible to adjust the force of the Upper Unit in the field, the configurations of the Front and Rear Angle Brackets have been changed as shown.



					REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**QTY**	**INT**	**PAGE**	**ITEM**
A0771098	A1521198	Torsion Bar Angle - Rear	1	3/S	39	4
A0771197	A1521197	Torsion Bar Angle - Front	1		39	24

UNITS AFFECTED:

All FT3013/3213 copiers manufactured after Serial Number A3605030154 and A3615030945 respectively will have the new style Torsion Bar Angles installed during production.

FIELD SERVICE MANUAL - INSERT PAGES:

The Torsion Bar force adjustment has been added to the field service manual. The revised areas have been highlighted by an arrow ⇒

- vi Table of Contents
- 5-94 Additional Information
- 5-95 Additional Information

BULLETIN NUMBER: 3013/3213-002 **12/13/94**
APPLICABLE MODEL: FT3013/3213

SUBJECT: FIELD SERVICE MANUAL - INSERT

GENERAL:

The Field Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 2 sets of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⟹

- 4-20 Updated Information

BULLETIN NUMBER: 3013/3213-003 **12/13/94**
APPLICABLE MODEL: FT3013/3213

SUBJECT: PARTS CATALOG UPDATES

GENERAL:

Please correct your Parts Catalog as follows:

	Part Number	Description	Parts Catalog	
			Page	Item
Incorrect	A0779501	Drum Anti-condensation Heater - 115V (Option)	13	18
	A0779502	Drum Anti-condensation Heater - 220V (Option)	15	39
Correct	AX400021	Anti-condensation Heater - 115V 18W (Option)	13	18
	AX400022	Anti-condensation Heater - 220V 18W (Option)	15	39

BULLETIN NUMBER: 3013/3213-004 **02/09/95**
APPLICABLE MODEL: FT3013/3213

SUBJECT: PARTS CATALOG CORRECTIONS

GENERAL:

The following Parts Catalog corrections are being issued for all FT3013/3213 Parts Catalogs. This information should be incorporated into all existing FT3013/3213 Parts Catalog documentation.

1. Please delete the following parts from your Parts Catalog:

		REFERENCE	
PART NUMBER	**DESCRIPTION**	**PAGE**	**ITEM**
A1521367	Decal - Symbol Explanation - German	59	1
A1521368	Decal - Symbol Explanation - French	59	1
A1521369	Decal - Symbol Explanation - Italian	59	1
A1521370	Decal - Symbol Explanation - Spanish	59	1
A1528601	Operating Instructions - German	59	3
A1528602	Operating Instructions - French	59	3
A1528603	Operating Instructions - Italian	59	3
A1528604	Operating Instructions - Spanish	59	3

2. Please correct your Parts Catalog as follows:

			REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**PAGE**	**ITEM**
A1528600	A1528608	Operating Instructions - A4 English	59	3

BULLETIN NUMBER: 3013/3213-005 **03/13/95**
APPLICABLE MODEL: FT3013/3213

SUBJECT: FIELD SERVICE MANUAL - INSERT

GENERAL:

The Field Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 2 sets of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⟹

- 5-60 Updated Information

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 006 **10/26/95**

APPLICABLE MODEL: FT3013/3213

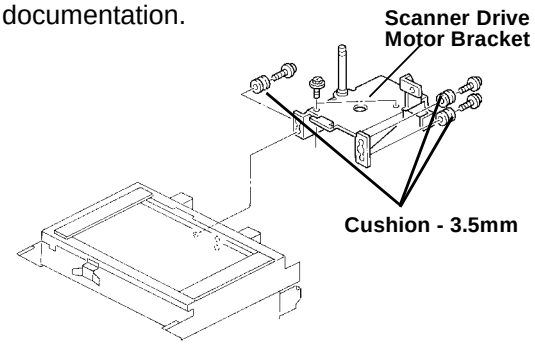
Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: PARTS CATALOG UPDATES

GENERAL:

The following Parts Updates are being issued for all FT3013/3213 Parts Catalogs. This information should be incorporated into all existing FT3013/3213 Parts Catalog documentation.

- **UPDATE NO. 1 -** CUSHION - To reduce noise, cushions have been added to the Scanner Drive Motor Bracket as shown.



			REFERENCE	
PART NUMBER	**DESCRIPTION**	**QTY.**	**PAGE**	**ITEM**
A1521738	Cushion - 3.5mm	0 → 3	11	34 *

* DENOTES NEW ITEM

UNITS AFFECTED:

Not available at time of publication.

- **UPDATE NO. 2 -** PARTS CATALOG CORRECTION - Please remove the following part from the Parts Catalog. If you need to replace this item, please order the DC Harness (A1525360).

			REFERENCE	
PART NUMBER	**DESCRIPTION**	**QTY**	**PAGE**	**ITEM**
A1525036	Operation Panel Harness	1 → 0	45	22

INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 007 **10/26/95**

APPLICABLE MODEL: FT3013/3213

Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: USER-CODE (U-O)

SYMPTOM:

User Code U-O is displayed at power up.

CAUSE:

The first scanner may accidentally move away from its home position during transportation/re-location of the machine. If the main switch is turned "ON" under this condition, U-O appears.

SOLUTION:

Power the machine "OFF" and return the scanner to the home position. Then power "ON" the machine to clear the U-O condition.

FIELD SERVICE MANUAL - INSERT

GENERAL:

The Field Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 2 sets of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⇒

• 4-24	Updated Information	Add User-code U-O

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 008 **1/26/96**

APPLICABLE MODEL: FT3013/3213

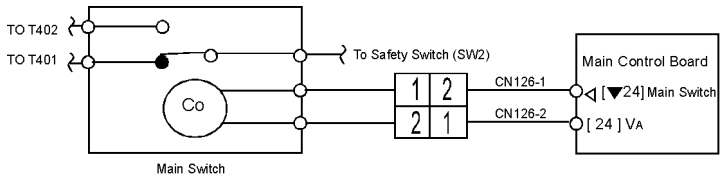
EPA POLLUTION PREVENTER

SUBJECT: ENERGY STAR MODIFICATION (DETAILS)

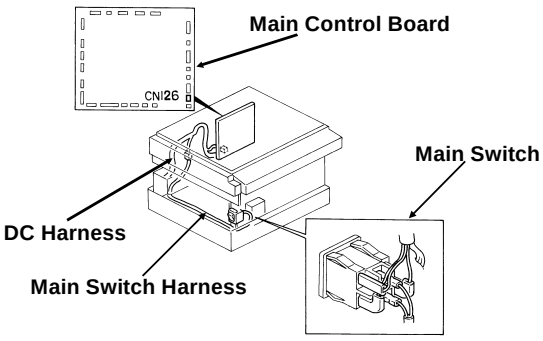
GENERAL:

To conserve energy, the copier automatically turns "OFF" 30 minutes after the last copy job has been completed. The details of the machine operation are as follows:

- **AUTO OFF MODE** To automatically turn "OFF" the copier, a new type of Main Switch with an incorporated coil is used. When the CPU drops CN126-1 from +24V to 0, the Main Switch contact is opened. The Point-to-Point wiring diagram and connector layout are shown below.



Point-to-Point Diagram



NOTE: *For part numbers, refer to Tech Service Bulletin No. 3013/3213-009*

- **SP MODE** The following SP modes have been added to the Field Service Manual. Replace page 4-13 and 4-22 of the Field Service Manual with the updated pages provided with this package.

Mode No.	Function	Settings
SP14	Auto off time can be selected	0 : 30 minutes (default) 1 : 15 minutes 2 : 1 hour 3 : 1.5 hours 4 : 2 hours
SP9-7	Output Check for the Main Switch (the machine will turn "OFF")	

The Auto Off time can also be selected by the customer. Refer to page 2 of this bulletin for the procedure.

- **INSTRUCTION SHEET** An additional explanation sheet has been added to the operating instructions. Please make copies of the following pages and add them to the operating instructions that were shipped with the copier.

Continued...

ENERGY SAVING INFORMATION

As an Energy Star Partner, we have determined that this copier model meets Energy Star Guidelines for energy efficiency.

This product was designed to reduce the environmental impact associated with copying equipment by means of energy saving feature such as AUTO OFF and ENERGY SAVER MODES.

About The Energy Saving Features of this Copier

Auto Off Mode

To conserve energy, this copier model automatically turns off 30 minutes after the last copying job has been completed. Power consumption is reduced from 0.16 kW (standby) to 0 kW.

To exit the Auto Off Mode, turn on the main switch. The main switch for this copier has three positions, press it all the way and hold for 1 - 2 seconds.

Changing the Auto Off timer

You can change the default time of 30 minutes using the procedure below.

1. Enter "7" by using the Number key.
2. Press and hold the Clear/Stop key until a dot (•) appears in the top left corner of the copy counter.
3. Press the Clear/Stop key again.
4. Press the Lighter key. "5" will blink on the copy counter.
5. Enter "14" using the Number keys.
6. Press the Auto Image Density key.
7. If your machine is the type 1, the present setting is displayed on the copy counter. If your machine is the type 2, the present setting is displayed on the Magnification Ratio indicator. Enter the desired setting using the Number keys referring to the following table.

Setting	Definition
0	30 minutes (default)
1	15 minutes
2	1 hour
3	1.5 hours
4	2 hours

8. Press the Auto Image Density key to store the required setting. "14" will blink on the copy counter.
9. Turn off and on the main switch to return to the Standby condition.

Continued...

Energy Saver Mode

The copier will automatically enter a low power condition after the last copy is made.

Substantial energy savings can be achieved by reducing the copier fusing unit temperature and slightly increasing the time required for the machine to return to a ready condition. It is selectable depending upon your office requirements.

The factory default setting is no savings / no wait time. Upon your request, your service representative can change this setting to one of the four ratios. The greater the saving ratio, the more time the copier will need to return to the ready condition.

Additionally your service representative can change how long the copier waits before automatically entering the Energy Saver Mode. The factory default is 1 minute and may be changed to 3 minutes.

How to Exit Energy Saver Mode

Any one of the following will cause the copier to return to the ready condition:

- Pressing any key with the exception of the Start key.
- Setting the originals in the optional document feeder.
- Opening or closing the bypass table.

Recycled Paper

Please contact your sales or service representative for recommended recycled paper types that may be used in this copier.

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 009 **1/26/96**

APPLICABLE MODEL: FT3013/3213

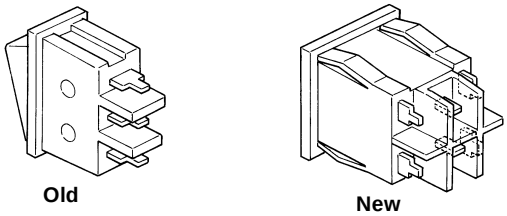
Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: PARTS CATALOG UPDATES

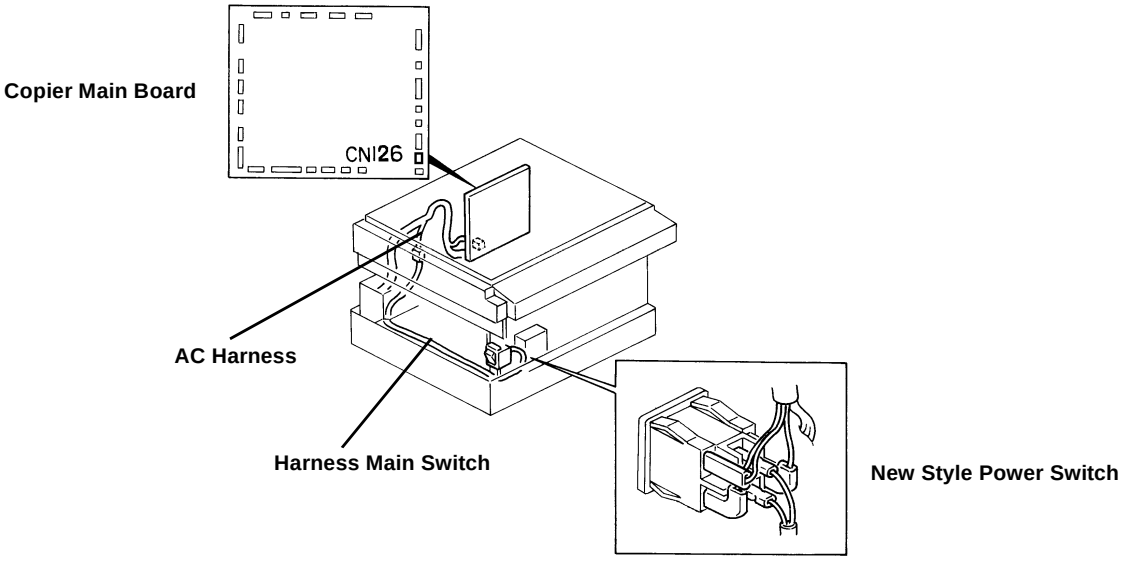
GENERAL:

The following modifications have been made to comply with the Energy Star requirements discussed in Publications Bulletin #PUB-066. This information should be incorporated into all existing Parts Catalog documentation.

1. MAIN SWITCH - The Main Switch has been changed to a rocker type switch. This type of switch will automatically shut "OFF" power to the copier if the machine has not been used for a certain periodfo time.



2. MAIN BOARD, etc... - A control circuit and a 2P connector have been added to the main board.
   A Harness Main Switch (described above) has been added.
   Two wires have been added to the AC Harness.

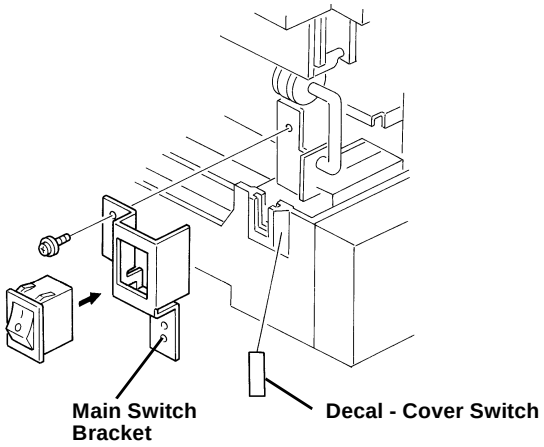


INTERCHANGEABILITY CHART:

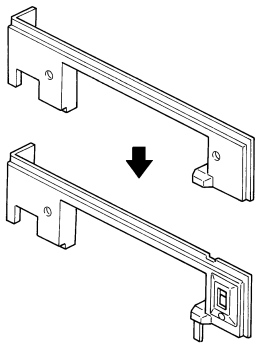
0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured aft er the S/N cut-in or previously modified, use the new part numbers individually.		

Continued...

3. The Main Switch Bracket has been added to secure the new main switch.
   The cover switch decal has been added to cover the symbol for the old main switch.



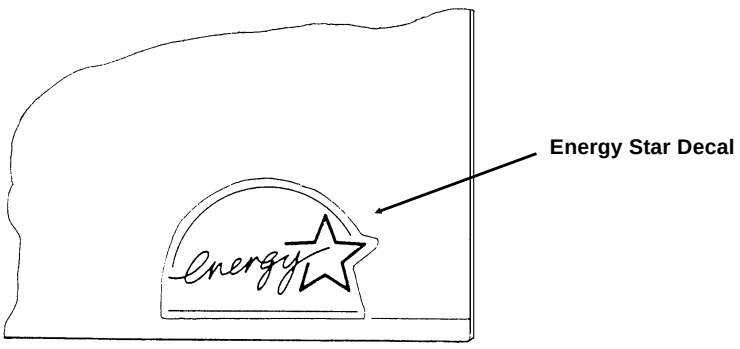
4. The Left Lower Cover has been modified to provide an opening for the new Main Switch.



5. The AC Harness has been extended to compensate for the change in the position of the main switch.
   The new components added to the main board are as follows:

Part Number	Description
11024201	CN126
14000291	Q110
14020780	D106
16114222	R173, R174

6. The Energy Star decal has been added on the bottom right corner of the front cover.



Continued...

					REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**QTY**	**INT**	**PAGE**	**ITEM**
12041576	A1525220	Main Switch	1 → 1	3	41	105
	A1521343	Main Switch Bracket	0 → 1		41	44*
A1515100	A1515106	Main Control Board (FT3013)	1 → 1	1	45	13
A1525100	A1525106	Main Control Board (FT3213)	1 → 1	1	45	13
A1525105	A1525108	IC512 X 8 150NS D (FT3213)	1 → 1	1	49	2
A1515105	A1515108	IC512 X 8 150NS D (FT3013)	1 → 1	3	49	2
11024201		Connector 2P	1 → 2		49	104
14000291		Transistor 2SA1020Y	1 → 2		49	128
	14020780	Diode 11ES2	0 → 2		49	220*
	16114222	Resistor (R173 & R174)	0 → 2		48	214
A1525313	A1525314	AC Harness	1 → 1	1	45	14
	A1525324	Harness Main Switch	0 → 1		45	25
A1521325	A1521340	Left Lower Cover	1 → 1		7	19
	A1526728	Decal - Left Cover	0 → 1		7	20*

* DENOTES NEW ITEM

UNITS AFFECTED:

All FT3013/3213 copiers manufactured after Serial Number A3605081364 and A3615081067 respectively will have the parts listed above installed during production.

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 010 **1/26/96**

APPLICABLE MODEL: FT3013/3213

EPA POLLUTION PREVENTER

SUBJECT: AUTO-OFF TIMER MODIFICATION

Note: This copy intended as master of original for reproduction of additional bulletins.

SYMPTOM:

Normally, the Auto-Off Timer begins counting down after the Main Switch is turned "ON". The timer should be reset and begin counting down again after a copy run (or any other copier function) has been completed. The period for the Auto-Off Timer can be adjusted from 30 minutes to two hours with SP 14.

However, for a certain production run, (see Units Affected), the Auto -Off Timer is not resetting properly. As a result, the copier powers "OFF" after the specified Auto-Off period regardless of whether or not the machine has been used during that time.

CAUSE:

Main Board ROM.

SOLUTION:

Install the updated ROM (FT3013 -**A1515108A** , FT3213 - **A1525108A**).

UNITS AFFECTED:

All FT3013 copiers manufactured from A360508XXXX through A360511XXXX and all FT3213 copiers manufactured from A361508XXXX through A361511XXXX will require the upgraded ROM.

ORDERING PROCEDURE:

Ricoh Corporation will automatically ship one replacement ROM for each unit shipped based on Ricoh's Equipment Shipped Records. Those units still in Ricoh inventory will be shipped with a new ROM Kit to be installed upon machine setup.

ENERGY SAVING INFORMATION SHEET

1. Locate the Energy Saving Information Sheet provided with the copier and discard.
2. Replace with the "new" Information Sheet provided (see attachment, 1 page).

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 011 **09/04/96**

APPLICABLE MODEL: FT3013/3213

Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: PARTS CATALOG CORRECTION

GENERAL:

The following Parts Catalog Correct is being issued for all FT3013/3213 Parts Catalogs. This information should be incorporated into all existing Parts Catalog documentation.

				REFERENCE	
INCORRECT PART NO.	**CORRECT PART NO.**	**DESCRIPTION**	**QTY**	**PAGE**	**ITEM**
AA151617	AA150196	Shielding - Toner Hopper - Left	1 → 1	27	29

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 012 **03/13/97**

APPLICABLE MODEL: FT3013/3213

Note: This copy intended as master of original for reproduction of additional bulletins.

SU EC : PAR S CA AL C RREC I N

ENERAL:

The following Parts Catalog Correction is being issued for all FT3013/3213 Parts Catalogs. This information should be incorporated into all existing Parts Catalog documentation.

Please correct your Parts Catalog as follows.

				REFERENCE	
L PAR N	NE PAR N	ESCRIP I N		PA E	I EM
A0774010	A1524010	Fusing Unit Cover	1 → 1	33	1

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213 - 013 **05/06/97**

APPLICABLE MODEL: FT3013/3213

Note: This copy intended as master of original for reproduction of additional bulletins.

SU EC : PAR S CA AL C RREC I N

ENERAL:

Correct the Part Number and Description of item #3 as shown below. This information should be incorporated into all existing FT3013/3213 Parts Catalog documentation.

INC RREC

			REFERENCE	
PAR NUM ER	ESCRIP I N		PA E	I EM
A1522856	Spring Plate	2	17	3

C RREC

			REFERENCE	
PAR NUM ER	ESCRIP I N		PA E	I EM
A1522855	Guide Plate	2	17	3

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213/3513/3713 - 014 **7/29/97**

APPLICABLE MODEL: FT3513/3713

Note: This copy intended as master of original for reproduction of additional bulletins.

SU EC : SERVICE MANUAL INSER

ENERAL:

The Service Manual page(s) listed below must be replaced with the page(s) supplied. Each bulletin package contains 1 set of replacement pages.

PA ES:

The revised areas have been highlighted by an arrow⇒

- 8-2 Updated Information
- 8-17 Updated Information
- 8-26 Updated Information
- 8-34 Updated Information
- 8-36 Updated Information
- 8-38 ~ 8-39 Updated Information
- 8-41 Updated Information
- 8-43 ~ 8-46 Updated Information
- 8-48 ~ 8-50 Updated Information
- 8-52 Updated Information
- 8-57 ~ 8-58 Updated Information
- 9-1 Updated Information

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213/3513/3713 - 015 **7/29/97**

APPLICABLE MODEL: FT3513/3713

Note: This copy intended as master of original for reproduction of additional bulletins.

SU EC : PAR S CA AL C RREC I NS

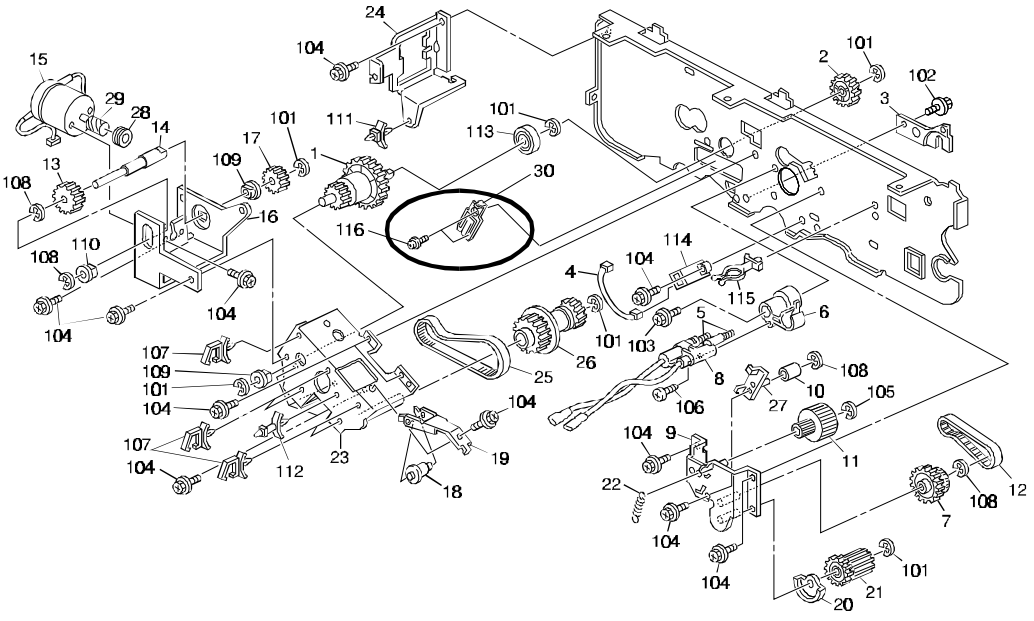
ENERAL:

The following Parts Catalog corrections are being issued for all FT3513/3713 Parts Catalogs. This information should be incorporated into all existing Parts Catalog documentation.

1. Part Number/Description Correction

			REFERENCE	
L PAR N	NE PAR N	ESCRIP I N	PA E	I EM
A2026205		Upper Cover (A202) (NRG/INF)	7	16
	A2031260	Upper Cover (NRG/INF)	7	16

2. Not Listed



			REFERENCE	
PAR NUM ER	ESCRIP I N		PA E	I EM
A0777680	Bias Terminal Ass'y	1	43	30
09513010W	Philips Screw with Flat Washer M3 x 10	2	43	116

Continued...

3. Change the following item into letters as it is a PM part

			REFERENCE	
PAR NUM ER	**ESCRIP I N**		**PA E**	**I EM**
A0779521	Separation Corona Wire - 10 pcs/set	1	31	12

4. Add the following to your PM parts index

S N	**P N**			**P I N**
Transfer/Separation Section (A202/A203)	A0779521	Separation Corona Wire - 10 pcs/set	1	31-12

RICOH TECHNICAL SERVICE BULLETIN

CUSTOMER SERVICE GROUP

BULLETIN NUMBER: 3013/3213/3513/3713 - 016 **11/17/97**

APPLICABLE MODEL: FT3513/3713

Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: SOFTWARE MODIFICATION

SYMPTOM:

1. E54 is indicated after warm-up, usually seconds after the Fusing Lamp has turned off at 185°C. This occurs only on the machines that have Fusing Phase Control Mode turned ON.

2. Trailing edge deletion in 65% reduction on the FT3713 only.

CAUSE:

1. Software Bug, when using Phase Control Mode, SP29 set to 1.

2. Software Bug on the FT3713 only.

Field Countermeasure:

1. Set SP 29 to 0 On/Off Control.

Production Countermeasure:

1. New Firmware applied during production, "E" version ROM.

2. Install 'F' version ROM for the FT3713.

Note: *Do not select the Phase Control Mode unless needed.*

UNITS AFFECTED:

All FT3513/3713 copiers manufactured after Serial Number A7407900066 & A7417900734 will have the new "E" version ROM installed during production. The Serial Number for the FT3713 'F' version ROM was not available at the time of publication.

Continued...

ORDERING PROCEDURE:

To obtain the ROM at no charge, please complete and fax the attached form to Technical Services or download a Hex file for local programming via the Ricoh Technical Services BBS (refer to Service News and Information No.147)

Fax this entire page in "DETAIL" mode ATTN: Technical Services - Copier

Fax Number: 973-882-3960

Each serial number given will represent a request for 1 ROM.
(FT3513 ROM P/N A2025108E or FT3713 ROM P/N A2035108F)

Note: ***The ROM will be available at no charge for 90 days (until January 31, 1998).***

Serial Number (s)			
1		6	
2		7	
3		8	
4		9	
5		10	

All serial number information will be verified before shipment is made.

NOTE: *Old ROM's must be returned within five (5) days to:*

Ricoh Corporation
Att: Tech Service - Copier
155 Passaic Avenue
Fairfield, NJ 07004

NOTE: ***Ricoh will not issue addition ROMs to locations that <u>do not</u> return the old ROMs.***

PLEASE TYPE OR PRINT CLEARLY.

DEALER NAME:		
ADDRESS:		
CITY:	**STATE:**	**ZIP CODE:**
ATTENTION:	**PHONE #** :	
DEALER ACCOUNT NUMBER:		

RICOH CUSTOMER SERVICE GROUP TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: 3013/3213/3513/3713 – 017 **03/17/98**

APPLICABLE MODEL: FT3013/3213/3513/3713

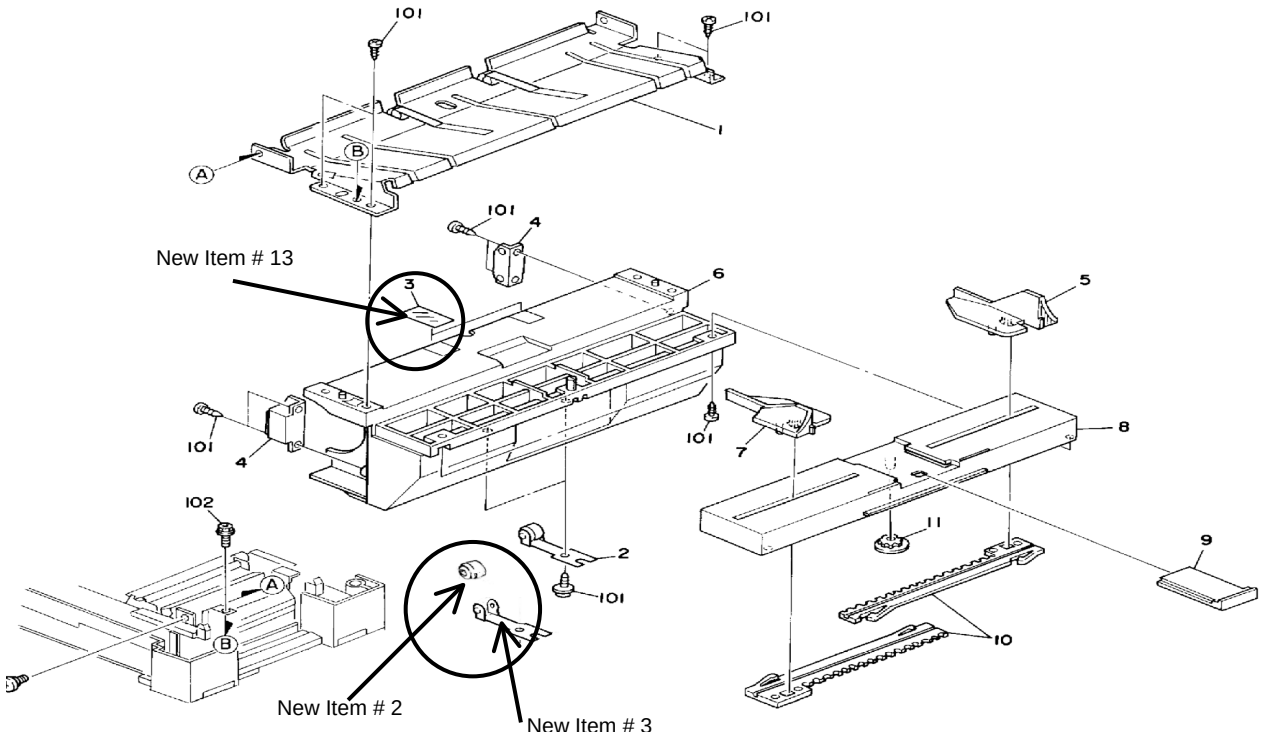
Note: This copy intended as master of original for reproduction of additional bulletins.

SUBJECT: FEED MYLAR

GENERAL:

We have made corrections on Page 16 ~17 of the Parts Catalog . Please correct your Parts Catalog as follows:

1) Item No. 3, of the illustration on page 16 is the Feed Mylar and has the incorrect item number. The correct item number for the Feed Mylar should be 13. The correct part number is A1522855 and should be described as " Feed Mylar "
2) Item No. 2, Spring Plate (AF022078) will now be available as two parts, Item No. 2 the Roller (AF022078) and Item No. 3 the Spring Plate (A1522856).
3) The following Parts Corrections are being issued for all FT3013/3213/3513/3713 Parts Catalogs.



				REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**QTY**	**PAGE**	**ITEM**
AF022078 →	AF022078	Roller – 12	2	17	2
	A1522856	Spring Plate	2	17	3
	A1522855	Feed Mylar	2	17	13 *

*** DENOTES NEW PART**

Continued ...

Note: The three Bulletins that were issued for the 3513/3713 series and were numbered 001, 002, 003, should have been released under the 3013/3213/3513/3713 series. Because of this oversight they have been renumbered as :

		Date
3013/3213/3513/3713 – 014	**Service Manual Insert**	**07/29/97**
3013/3213/3513/3713 – 015	**Parts Catalog Corrections**	**07/29/97**
3013/3213/3513/3713 – 016	**Software Modifications**	**11/17/97**

These bulletins will not be reissued at this time, please renumber the existing bulletins as indicated above.

TECHNICAL

savin BULLETINS

Gestetner BULLETINS

Click on the Directory you wish to view.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 001 **05/20/98**

APPLICABLE MODEL:

GESTETNER – 2713/2713Z
RICOH – FT3513/3713
SAVIN – 9113/9113Z

The chart listed below shows the Last Bulletin Number issued for the A151/A152/A202/A203 series.

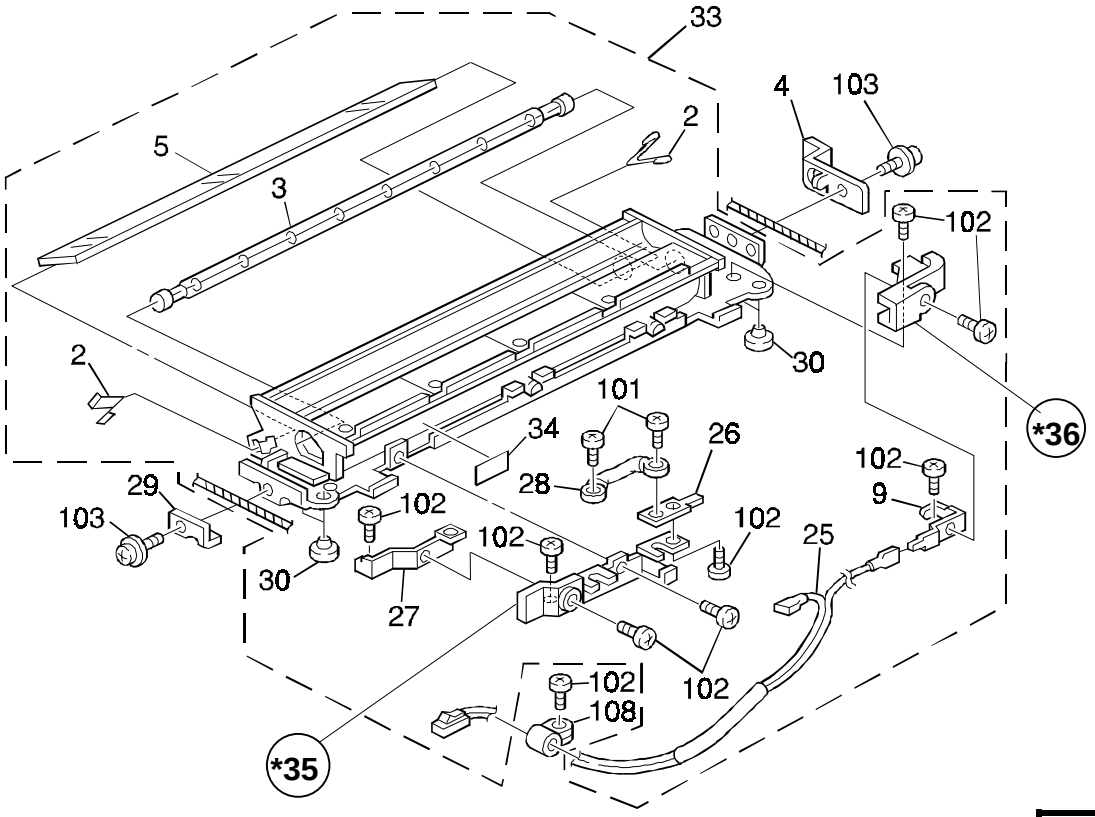
Bulletin Cross Reference	
Ricoh Group Companies	**Last Bulletin No.**
Gestetner	**011**
Ricoh	**017**
Savin 9113	**002**
Savin 9013	**008**

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: TERMINAL HOLDERS

GENERAL:

The part numbers for the Terminal Holders were omitted from the original Parts Catalog. Please update your Parts Catalogs with new Items 35 and 36. The following parts updates are being issued for all A202 and A203 Parts Catalogs.



			REFERENCE	
PART NO.	**DESCRIPTION**	**QTY**	**PAGE**	**ITEM**
A0771665	Front Terminal Holder	1	11	35 *
A0771666	Rear Terminal Holder	1	11	36 *

* Denotes new part.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 – 002 **05/28/98**

APPLICABLE MODEL:

GESTETNER – 2713/2713Z
RICOH – FT3513/FT3713
SAVIN – 9113/9113Z

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: SOFTWARE MODIFICATION

SYMPTOM:

1. E54 is indicated after warm-up, usually seconds after the Fusing lamp has turned off at 185°C. This occurs only on the machines that have Fusing Phase Control Mode turned ON.

2. Trailing edge deletion in 65% reduction on the A203 only.

CAUSE:

1. Software problem when using Phase Control Mode, SP29 set to 1.

2. Software problem on the A203 only.

FIELD SOLUTION:

1. Set SP 29 to 0 ON/OFF Control.
   Note: To clear the E54 code, use SP97:
   1- Turn ON the Main Switch.
   2- Enter "71" by using the number keys.
   3- Press and hold the Clear/Stop key until a dot (●) appears in the top left corner of the Copy Counter and then release the Clear/Stop key.
   4- Press the Clear/Stop key again and then depress the Lighter key. A "5" will blink in the Copy Counter to indicate that SP Mode has been accessed.
   5- Enter SP 97 using the number keys. Then press the Auto ID key. Enter "1", then press the Auto ID key.
   6- Turn the Main Switch OFF the ON.

PRODUCTION SOLUTION:

1. New Firmware applied during production, "E" version ROM.

2. Install "F" version ROM for A203.

GENERAL:

The following parts updates are being issued for all A202 and A203 Parts Catalogs.

					REFERENCE	
PART NO.	**DESCRIPTION**	**OLD SUFFIX**	**NEW SUFFIX**	**QTY**	**PAGE**	**ITEM**
A2025108	IC – UVEPROM 512K x 8 (A202)	D	E	1	49	5
A2035108	IC – UVEPROM 512K x 8 (A203)	E	F	1	53	4

Continued…

The Main Board ROM (A202) revision E (file name 3513M1.EXE) can be downloaded through the Ricoh Technical Services BBS. The Main Board ROM (A203) revision F (file name 3713M2.EXE) can be downloaded through the Ricoh Technical Services BBS. These ROM's can also be ordered through normal NSPC channels.

NOTE: *For more information about the Ricoh Technical Services BBS, order the Guide to Operation (P/N BBS00001) through normal NSPC channels.*

UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style ROM installed during production.

MODEL NAME	SERIAL NUMBER
Gestetner 2713 (ROM "E")	AJ87890001
Ricoh FT3513 (ROM "E")	A7407900066
Savin 9113 (ROM "E")	7A97900001
Gestetner 2713Z (ROM "F")	AM97910385
Ricoh FT3713 (ROM "E")	A7417900734
Ricoh FT3713 (ROM "F")	A7417910563
Savin 9113Z (ROM "F")	8A17910001

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 003 **09/11/98**

APPLICABLE MODEL:
GESTETNER 2713/2613Z
RICOH FT3513/3713
SAVIN 9113/9113Z

Note: This copy intended as master original for reproduction of additional bulletins.

■ SERVICE MANUAL

SUBJECT: SERVICE MANUAL - INSERT

GENERAL:

The Service Manual pages listed below must be replaced with the pages supplied. Each bulletin package contains 1 set of replacement pages.

PAGES:

The revised areas have been highlighted by an arrow ⇒.

A202/A203

- 8-41 Corrected Information (SP-57)
- 8-42 Corrected Information (SP-66 & SP-69)

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 004 **09/11/98**

APPLICABLE MODEL:
GESTETNER – 2613/2613Z/2713/2713Z
RICOH – FT3013/3213/3513/3713
SAVIN – 9013/9013Z/9113/9113Z

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: NOISE FROM CLEANING UNIT

SYMPTOM:

Squeaking noise coming from the Cleaning Unit.

CAUSE:

A possible cause may be deformation of the Cleaning Blade.

SOLUTION:

A new style Cleaning Blade with impact resilience lower than the present Cleaning Blade has been designed. This Cleaning Blade has been tested with good results in eliminating the noise problem.

GENERAL:

The following part update is being issued for all A151 and A152 Parts Catalogs.

				REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**QTY**	**PAGE**	**ITEM**
AD002044	A1519532	Cleaning Blade	1	29	9

NOTE: *The new style Cleaning Blade is only available as a service part.*

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A202/A203 – 005 **10/13/98**

APPLICABLE MODEL:
GESTETNER – N/A
RICOH – N/A
SAVIN – 9113/9113Z

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: UPPER COVER (SAVIN ONLY)

GENERAL:

For generic use, the Upper Covers for both the A202 and A203 have been changed. The previous type covers had SAVIN logos printed on them and the new covers have no logos. The decals for the SAVIN logos are packed in the machine boxes. The decal has to be affixed on the Front Cover when the Upper Cover is replaced. The following Parts Corrections are being issued for all A202/A203 Parts Catalogs.
NOTE: *Be sure to order the appropriate decal when replacing the Front Cover*

					REFERENCE	
OLD PART NO.	**NEW PART NO.**	**DESCRIPTION**	**QTY**	**INT**	**PAGE**	**ITEM**
A2026655	A2031260	Upper Cover (A202)(SVN)	1	1	7	16
A2036655	A2031260	Upper Cover (A203)(SVN)	1	1	7	16
-	A2028650	Decal – Model Name – SVN	1		7	20
-	A2038680	Decal – Model Name – SVN	1		7	20

INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

UNITS AFFECTED:

All copiers manufactured after the Serial Numbers listed below will have the new style Upper Cover installed during production.

MODEL NAME	SERIAL NUMBER
Savin 9113	7A98870104
Savin 9113Z	8A18860001Cover 8A18870001 Decal

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 006 **05/11/99**

APPLICABLE MODEL:

GESTETNER – 2713/2613Z
RICOH – FT3513/3713
SAVIN – 9113/9113Z

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: RELAY

GENERAL:

The following part update is being issued for all A202/A203 Parts Catalogs. Please update your Parts Catalog with the following change.

					REFERENCE	
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE	ITEM
12081138	12081422	Relay–OMI-SS-124LM	1	0	55	117

UNITS AFFECTED:

A202/A203 Serial Number cut-in not available at time of publication.

INTERCHANGEABILITY CHART:

0	OLD and NEW parts can be used in both OLD and NEW machines.	2	NEW parts CAN NOT be used in OLD machines. OLD parts can be used in OLD and NEW machines.
1	NEW parts can be used in OLD and NEW machines. OLD parts CAN NOT be used in NEW machines.	3	OLD parts CAN NOT be used in NEW machines. NEW parts CAN NOT be used in OLD machines.
3/S	Must be installed as a set on units manufactured prior to the S/N cut-in. On units manufactured after the S/N cut-in or previously modified, use the new part numbers individually.		

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 007 **09/07/99**

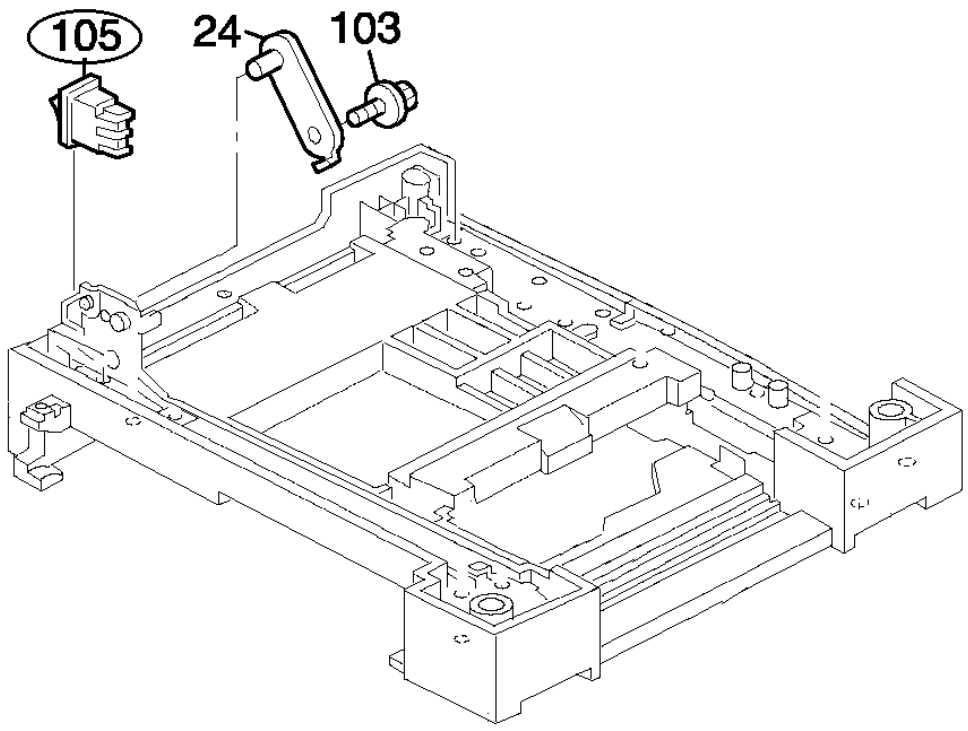
APPLICABLE MODEL:
GESTETNER – 2713/2713Z
RICOH – FT3513/3713
SAVIN – 9113/9113Z

Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: MAIN SWITCH

GENERAL:

The following part correction is being issued for all A202 and A203 Parts Catalogs. Please update your Parts Catalogs with the following information.



			REFERENCE	
INCORRECT PART NO.	CORRECT PART NO.	DESCRIPTION	PAGE	ITEM
12041576	A1905222	Main Switch	41	105

UNITS AFFECTED:

A202 and A203 Serial Number cut-ins not available at time of publication.

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: A151/A152/A202/A203 - 008 **04/28/2000**

APPLICABLE MODEL:

GESTETNER –2713/2713Z
RICOH –3513/3713
SAVIN –9113/9113Z

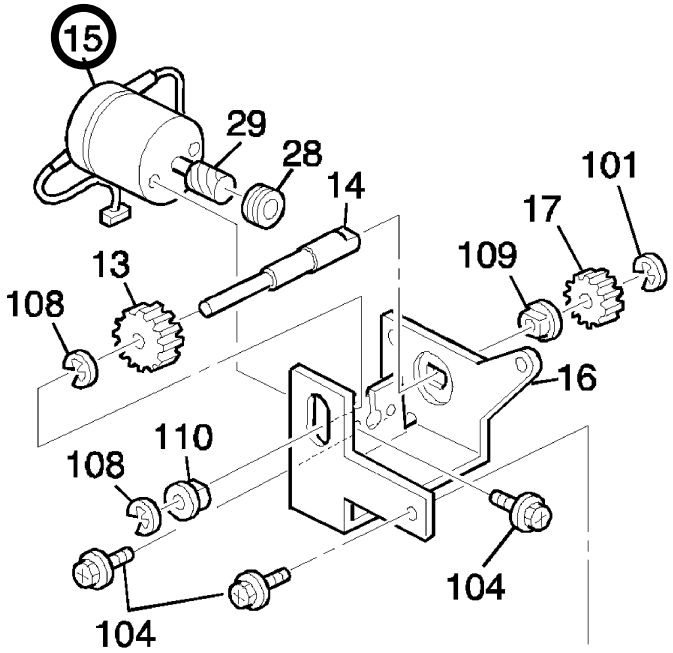
Note: This copy is intended as a master original for reproduction of additional bulletins.

SUBJECT: BOTTLE DRIVE MOTOR

GENERAL:

The following part correction is being issued for all A202/A203 Parts Catalogs.

19. DRIVE SECTION (A202/A203)



					REFERENCE	
OLD PART NO.	NEW PART NO.	DESCRIPTION	QTY	INT	PAGE	ITEM
A2031166	A2031165	Bottle Drive Motor	1-1	1	43	15

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